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Specify MERCK'S
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THE MASSACHUSETTS COLLEGE OF PHARMACY 74 St. Botolph St., Corner of Garrison : BOSTON, MASS.

A College of Pharmacy, controlled and managed by pharmacists, in which the teaching is largely by the laboratory method. The possession of a liberal endowment makes it possible to give superior courses without increase of cost to the student.

Regular course of two years, leading to the degree of Graduate in Pharmacy (Ph. G.) Many students take three years to complete this course, working in drug stores while doing so. The College is generally able to secure positions with College privileges for such students.

Post-graduate course of one year, leading to the degree of Pharmaceutical Chemist, (Ph. C.)

The annual session begins during the latter part of September and ends during May.

A general education equivalent to the completion of one year in a high school, as shown by certificate or examination, is required for entrance.

For catalogue and further information, write to THEODORE J. BRADLEY, Ph. G., Dean.

SPECIAL ATTENTION.—Drug stores (snaps) for sale and trade in 48 states. Drug stores handled. Drug jobs in 48 states. Physicians, dentists, veterinarians, nurses furnished and located. Established 1904. Strictly reliable. Gilt edge references. Let me know your wants. F. V. KNIEST, R. P., Omaha, Nebr.

INDEPENDENCE NUMBER

Let our object be, our country, our whole country, and nothing but our country.
—*Webster.*

The Journal of the American Pharmaceutical Association

Volume III **JULY, 1914** **No. 7**

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HARMONY.

IN every co-operative undertaking, whether it be great or whether it be small, the most essential thing to its success is Harmony; the co-operation of all its forces in harmonious relation one with the other. And *per contra* the influence which is most disastrous and which most effectually results in non-success, in any undertaking, from that of the marriage-relation to that of the greatest co-operative undertakings, is dissonance, or lack of Harmony.

Those who are placed at the forefront of any undertaking, especially those to whom are entrusted the vital interests of any great body of men, cannot too deeply allow this thought to sink well into their minds, and to highly resolve that, so far as in them lies, they will endeavor to agree with their fellows and to subordinate all other desires, all other interests, to the central idea of Service to those who have honored them with their trust and confidence. *Noblesse oblige* should be their constant thought; that the high rank to which they have been elevated entails upon them the obligation to subordinate selfish and narrow interest to the good of those who have trusted them; who have deemed them wise and able to lead them out of the wilderness, into the smooth and peaceful plains of prosperity and peace.

It is somewhat regrettable that in the Symposium on the Harrison Bill, which appeared in the June issue of the JOURNAL, a note of dissonance should be apparent, and that a lack of concord among the members of the Drug Trades Conference should seemingly be noted.

The American Pharmaceutical Association, in formulating the plan for this conference, was actuated by the one high and noble purpose;—that of Service to the Drug Trade of the country, by opposing a bulwark of defense against the absurd and freakish legislation proposed, most of which, through ignorance of

conditions on the part of those proposing it, threatened to harass and annoy the honest and well-meaning members of the profession, while accomplishing but little of good result to the people.

There was no selfish thought in that effort. It was simply a wise attempt to unite all interests for mutual protection, and its wisdom has been proven by the results already achieved. Is it not possible for the members of this conference to place the greater interests of our profession above that of everything else, and to make that the bed-rock, the sole motive of all their acts? Or is it impossible for some men to forget their own selfish interests for a time and to act in a large and liberal way; in a way comprehensive of the general good?

Some one has written, "In essentials, Unity; in non-essentials, Harmony; in all things, Charity." Let this be the rule for the conduct of the business of the Conference, and the results achieved by it will be enhanced a thousand-fold. If we might be allowed to drop into slang, as Silas Wegg dropped into poetry, we might advise the members of the Conference to "Get together," and, forgetful of self, think only that the well-being and the destiny of a noble profession is in their keeping, and that its dignity and its welfare is in their care. "'Tis nae feesh yere buyin, it be men's lives," as the old fish-wife told the chaffering Laird, and it is not the interest of self or of the moment, that should guide the action of the members of the Drug Trade Conference, but the weighty thought that upon their wise action depends the welfare, the happiness, the destiny of the thousands of druggists, and of their wives and children, of this broad land.

The responsibility rests upon the members of that Conference to see that these interests are conserved and fostered, and it is greatly to be hoped that they will rise above all slighter considerations, and use their magnificent opportunity in a manner that will not only redound to their credit and honor, but also for the general welfare of the whole profession, which needs brave, strong, unselfish leadership, to guide its members in these troubled days.

<□>

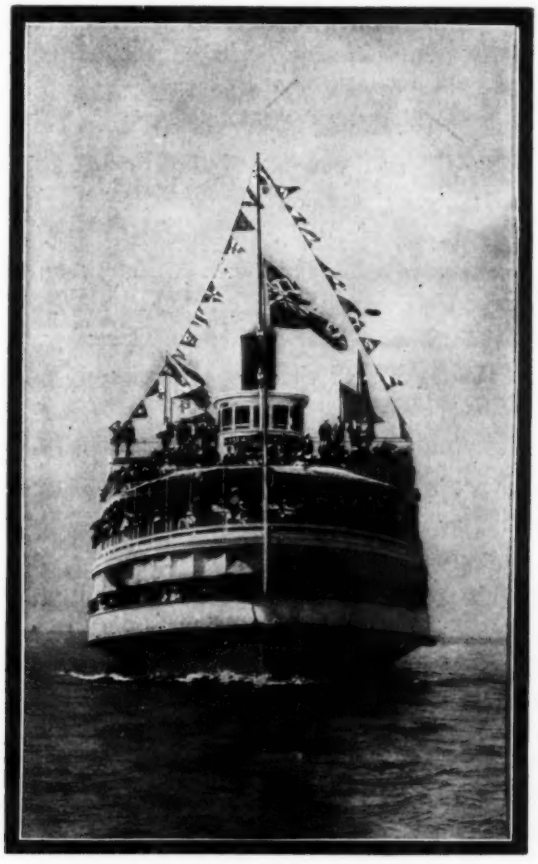
A FEW NOTES OF INTEREST ABOUT THE CONVENTION CITY.

Detroit was an outpost of the *Coureurs de Bois*, those famous wood-rangers, hunters and trappers of Canada; those outlaws against whom Louis the Grand, of France, launched those edicts intended to prevent their leaving the homes in which he was determined they should abide; to follow their own bent as free rangers of the forest; as men free from those laws which made them serfs and slaves of the nobles under the reign of the *Grand Monarque*, who thought all his subjects were born to minister to his pleasure. Pontchartrain was one of those nobles to whom *les droit des seigneurs* was a God-given right. I have wondered if the name Detroit had relation to these edicts of Louis, which were intended,—as were those he fulminated against the Protestant Huguenots,—to force them to do his will or to destroy them;—the French verb *"Detruit"* being the past participle of *"Detruire,"* which means, *"to destroy."* I cannot find any other derivation for its name stated anywhere, but perhaps I am far from the fact.

The Jesuit Father, Cadillac, is considered to be the founder of the city. In

June, 1701, he went there with about 100 men and built a fort, but before his time in 1686, Fort St. Joseph had been built, which showed that trade had already found it an attractive place before his arrival. Fort Gratiot now stands on the site of the old Fort St. Joseph.

Around this fort of Cadillac thronged the savage tribes of Ottawas and Foxes, the Wyandots and Crees, the Sacs and Senecas, the Delawares and Shawanees. Pontiac, the famous chief of the Ottawas, lived on a small island at the entrance



The P. D. Co.'s Stmr. Pleasure.

of Lake St. Clair. Every step a visitor takes here, is reminiscent of the trying experiences of our fore-fathers with the Indians; the latter, to be sure, often wronged. Here the readers of Parkman's "Conspiracy of Pontiac" will tread on familiar ground. Here civilization met barbarism; drove the aborigines from their homes and hunting-grounds to make this a beautiful city; one of the jewels of the Republic. To one interested in the early days of our land,—and what loyal citizen is not,—a visit to this district should prove most interesting and

instructive. England's flag floated over Fort Pontchartrain during our War for Independence and again, during the war of 1812, when it was captured by the British, but the peace of 1813 brought it once more to be American territory.

To-day, the most charming summer-city of America is making ready to receive the members of the A. Ph. A. to their hearts and homes. Charming Belle Isle, Grosse Pointe and the attractive Bois Blanc, (Bob-Lo) Flats are putting on their best array, and there is no member of the association, or a druggist in all America, but will receive a bountiful return for his attendance upon the Convention. "Get out and get under!" "Get out" of your narrow environment, your limited circle, and "get under" the movement to lift Pharmacy out of the sordid slough of commercialism, into its true heritage, that of noble and an honored profession.

ENTERTAINMENTS.

Monday:—Grand Ball, Hotel Pontchartrain. Evening.

Tuesday:—Nelson Baker's Excursion for ladies. Afternoon. Boat-ride and dinner at "Bob-Lo" Park.

Wednesday:—F. F. Ingram & Co. and the F. A. Thompson Co.'s Theatre-Party for ladies. Evening.

F. Stearn's Co. Social "Smoker" for gentlemen. Evening.

Thursday:—Parke, Davis & Co.'s Steamer-excursion up the river and through Lake St. Clair. For Everybody.

Friday Afternoon:—Automobile-trip, through the beautiful suburbs of Detroit. The Lake-side Drive. Belle Isle.

Saturday:—Farewells.

<□>

THE attempt of the Board of Pharmacy in Massachusetts to determine its powers over the establishment of chain-stores, in that Commonwealth is greatly to be commended.

Because the Court has decided that the contention of the Board,—that the Riker-Jaynes Company was not a corporation entitled to conduct the drug business because the majority of its stock-holders were not registered pharmacists,—was wrong, does not make that contention a less true or a less just one. If a syndicate of men who were not lawyers should form a corporation and attempt by the employment of lawyers to do business in that Commonwealth under their own corporate title, it is safe to say that the Honorable Justices would bar them from any appearance before the Court under their corporate title, even though their employes had been admitted to the bar, and it is difficult to see wherein the case differs from this one, where the members of this corporation are not registered pharmacists of the State of Massachusetts, and yet seek to make appearance before the public as such.

"And ne'er shall the sons of Columbia be slaves,
While the earth bears a plant or the sea rolls its waves."

—*Robert Treat Paine.*

PORT COCKBURN TRIP.

The rates for this most delightful excursion have been made at a figure which should tempt all the members attending the convention to take advantage of this opportunity to see this most delightful pleasure resort of the country.

The itinerary with rates is as follows: From Detroit to Toronto, to Bala, (the gateway to the Muskoka Lakes), a delightful water trip through the entire Muskoka Lakes to Port Cockburn, a short interesting stage ride to Maple Lake, a still shorter rail trip to Rose Point, a yacht trip to Parry Sound, thence a delightful water trip through the celebrated 30,000 Islands of the Georgian Bay to Penetang, rail to Toronto to Detroit, one of the most popular trips through the Highlands of Ontario. The total cost of the trip is $17.50 (exclusive of meals and berth), and the following shows approximate schedule. The trip may be broken at Toronto, Bala, Royal Muskoka Hotel, Port Cockburn, Parry Sound, etc., or any point desired. Limit of tickets Oct. 31st, 1914.

Daily						
Mon.	Lv.	Detroit	CPR	*12:50 AM	*Sleeper open at 9:00 PM	
Tues.	Ar.	Toronto	CPR	8:25 AM		
Tues.	Lv.	Toronto	CPR	9:45 AM	11:50 AM	
Tues.	Ar.	Bala	CPR	1:54 PM	3:40 PM	
Tues.	Lv.	Bala	MNCo.	3:50 PM	3:50 PM (Wed)	7:20 AM
Tues.	Ar.	Beaumaris	MNCo.	4:45 PM	4:45 PM	.....
Tues.	Ar.	Port Carling	MNCo.	5:35 PM	5:35 PM	9:10 AM
Tues.	Ar.	Royal Muskoka Hotel	MNCo.	6:50 PM	6:50 PM	10:15 AM
Tues.	Ar.	Minette	MNCo.	6:35 PM	6:35 PM	10:45 AM
Tues.	Ar.	Rosseau	MNCo.	8:00 AM	8:00 AM	11:30 AM
Tues.	Ar.	Port Sandfield	MNCo.	.....	.....	11:40 AM
Tues.	Ar.	Port Cockburn	MNCo.	9:00 PM	9:00 PM (Wed)	1:00 PM
Wed.	Lv.	Port Cockburn (Stage)	MNCo.	3:00 PM		
Wed.	Ar.	Maple Lake	MNCo.	4:30 PM		
Wed.	Lv.	Maple Lake	GTR	8:42 PM		
Wed.	Ar.	Rose Point	GTR	9:21 PM		
Wed.	Ar.	Parry Sound	GTR	9:30 PM		
Thurs.	Lv.	Parry Sound	NNCo.	6:40 AM		
Thurs.	Ar.	Penetang	NNCo.	12:01 Noon		
Thurs.	Lv.	Penetang	GTR	12:20 PM		
Thurs.	Ar.	Toronto	GTR	3:45 PM		
Thurs.	Lv.	Toronto	CPR	4:00 PM	7:35 PM } Remain in sleep-	
Fri.	Ar.	Detroit	CPR	11:30 PM	1:40 PM } er until 8:00 AM	

Lower berth fare between Detroit and Toronto $1.50, Upper berth fare $1.20, Drawing Room $6.00. Parlor-car seat fare, Toronto to Bala $0.50.

An interesting side trip from Parry Sound to Point Au Baril, Georgian Bay, which is fast becoming the most popular resorts in the Highlands of Ontario can be had for $2.85 which covers rail transportation Parry Sound to Point Au Baril Station, thence boat to either the Ojibway, Bellevue or Skerryvore Hotels, which Hotels are situated on beautiful islands in (Point Au Baril), Georgian Bay District. Return same way.

Causerie

IF WE KNEW.

If I knew you, and you knew me;
If both of us could clearly see,
And with an inner sight divine
The meaning of your heart and mine,—
I'm sure that we would differ less,
And clasp our hands in friendliness;
Our thoughts would pleasantly agree,
If I knew you, and you knew me.

—*Anon.*

The Columbus Branch will soon be "Topping" all others.

Dr. James H. Beal, the Editor of the Journal, is soon to leave Scio for his camp in Canada, where he will find much-needed relief and rest by getting close to nature and breathing the ozone of the pine-clad hills of the primeval forests. Dr. Beal was present at the meeting of the North Carolina Association at its meeting at Hendersonville, on June 17-18-19, and delivered an address on the first day of the Convention.

It is reported that a hungry man once said, "That his stomach had been asking his mouth if his throat was cut for some time." Apropos of this *ana* the humble A. E. would inform the Honorable Treasurer that his correct address is

63 CLINTON BUILDING, COLUMBUS, OHIO,

and that, "*Bis dat qui cito dat.*"

Mrs. John G. Godding, the President of the Women's Section, was the guest of Anna G. Bagley, the Secretary of the Section, for a few days last month, on her return from the Federation of Women's Clubs at Chicago. Prof. and Mrs. Kaufman gave a dinner-party to Mrs. Godding, on the evening of her departure from Columbus, at their charming home in Maple Grove.

The Acting Editor is practicing writing with both hands, in order to use the fountain pens sent to him from the Boston Association of Retail Druggists, with a handsome leather manuscript-carrier, all from the same kindly friends.

Between the farewell kindness of Boston and the welcoming kindness of Columbus, the A. E. is wondering if he had not better heed the maxim of the Japanese, "When things are coming your way, look out!", but in the meantime he is sincerely grateful for the many kindnesses showered upon him, is happy in his work and is earnestly desirous of "grappling to his soul with hoops of steel" all his friends, by loyal, faithful service to the important interests, temporarily placed in his care.

The Editor has been requested to call the attention of the members to Article 2, Section X, of the By-Laws, which refers to the reading of papers before the Sec-

tions, and prints the Article for the information of those desiring to present papers:

Article II. Any person desiring to submit a paper to the Association shall present to the Chairman of the particular Section to which it refers, at least ten days prior to the meeting, an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than two hundred words.

This abstract shall be printed as a part of the program. The paper itself must be submitted to the officers of the Section previous to the first session. Not more than ten minutes shall be allowed for the presentation of any paper, unless by unanimous consent of the Section. This does not apply to the Scientific Section, which handles its papers in accord with the By-Laws of said Scientific Section.

All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publications than those of the Association, except by the consent of the Committee on Publication.

RATES AND ROUTES FOR ATTENDING THE A. PH. A. CONVENTION TO BE HELD IN DETROIT, AUGUST 24TH TO 29TH, INCLUSIVE.

PRELIMINARY ANNOUNCEMENT.

Office of Chairman Committee on Transportation, 166 Chambers St., New York.

New York and New England: All rail to Detroit. Arrangements have been made with the Walter H. Woods Co., 262 Washington St., Boston, Mass., for an 18-day tour by New York Central Lines to Detroit, and return by way of Toronto, Lake Ontario, Thousand Islands, St. Lawrence River, Quebec and Montreal, thence through Central Vermont or the D. & H. Co. lines to Boston and New York.

The price of above tour, including railroad fares, Pullman, meals, rooms at Hotel Pontchartrain while in Detroit, with bath (2 in room); railroad and steamer fares with meals on St. Lawrence River trip, five days' room and board at Murray Isle Hotel at Thousand Islands, rooms and meals at other hotels and cars enroute, except meals while in Detroit,—

New York and return, 18 days, $123. Basing on 10 or more people.

Boston and return, 18 days, $124. Basing on 15 or more people.

Rate from Detroit, 11 days from date of departure to arrival in New York or Boston, $85. Descriptive circulars of this tour will be sent on application.

Train will leave South Station, Boston, August 22d, at 4.45 p. m., connecting in Albany, N. Y., at 9.40 p. m., with party from New York leaving the Grand Central Station at 6 p. m. This train will arrive in Detroit on Sunday, August 23d, at 1.30 p. m.

Rail and Lake Route, New York: Philadelphia, Baltimore and Washington to *Detroit*, by Lehigh Valley Railroad and connections to Niagara Falls and Buffalo, thence by steamer of the Delaware and Cleveland Navigation Co. to Detroit.

August 22d—Leave Washington by 3 p. m. train, B. & O. R. R. Leave Baltimore, 3.58 p. m. train, B. & O. R. R Leave Philadelphia, 6.30 p. m. train, P. & R R. R., which will meet the 6 p. m. train on Lehigh Valley from New York at South Bethlehem at 8.50 p. m., arriving Niagara Falls 7.10 a. m., Sunday, August 23d; leave Niagara Falls on day coach 4.22 p. m. same day, arrive Buffalo, 5.25 p. m. Leave Buffalo on D. & C. Co. steamer at 6 p. m., arriving in Detroit Monday, August 24th, 7.30 a. m.

Single fares, Washington to Detroit.....	$14.63—parties of ten	$12.45
Single fares, Baltimore to Detroit.....	$13.63—parties of ten	$11.70
Single fares, Philadelphia to Detroit.....	$13.10—parties of ten	$11.75
Single fares, New York to Detroit.....	$12.00—parties of ten	$10.95

A charge of 50 cents for transfer of baggage from train to boat in Buffalo.

From Cincinnati: Chicago, Hamilton & Dayton route is recommended; single fare to

Detroit $5.25; no reduction for parties. Railroad can be taken to Toledo and thence by White Star Steamer to Detroit at same fare; Pullman and staterooms extra.

From Cleveland: Where Tourist rates to Detroit are to be had it is best to purchase them. From points not having Tourist rates, purchase fare to Cleveland.

Cleveland to Detroit, via D. & C. Boat Line—leaves 11.45 p. m., Eastern time.

Fare—one way, $2.00.

Fare—round trip, $3.50.

Fare—round trip, parties of ten, $3.00.

State rooms, $2.50—accommodate three persons.

Those wishing to take a day ride on the lake, leave Cleveland at 8.30 a. m., Eastern time, arrive at Put-in-Bay at 12.45, leave Put-in-Bay, 3.30, arrive in Detroit, 8.00 p. m.

This historic island is well worth seeing, also the beautiful new monument, in honor of Commodore Perry's victory, which is about completed.

Transfer of boat is made at Put-in-Bay. This is no hardship as boat for Detroit is at same dock.

Fare—one way, $1.50. Round trip, $2.50.

On return trip from Detroit stop at Cedar Point, "Coney Island of the West," great place for conventions, well worth your while to visit. Take boat for Cleveland about 4.30 p. m. same day.

If further information is required, write

LEWIS C. HOPP, 1104 Euclid Ave., Cleveland, Ohio.

From Atlanta: Members from Southeast are advised to route via Louisville and Nashville, Atlanta to Cincinnati, C. H. & D. to Toledo, Pere Marquette, Toledo to Detroit, or by White Star Steamer, Toledo to Detroit, as they may prefer. L. & N. train schedules are as follows:

Leave Atlanta 7.12 a. m., arrive in Detroit 7:45 a. m. following day.

Leave Atlanta 5.10 p. m., arrive in Detroit 4.45 p. m. following day.

One way rate Atlanta to Detroit, $18.50; parties of ten, $15.20, or round trip summer tourist tickets can be purchased for $30, limited to October 31st return.

From New Orleans: Illinois Central to Chicago, Michigan Central to Detroit. Tickets on sale daily, good to return until October 31st. Fare, single, $43.00 in parties of ten or more, $22.00;—sleeper extra. For direct information, address Edward Roddy, 144 St. Charles St., New Orleans.

From St. Louis: The St. Louis party for the Detroit meeting of the A. Ph. A., August 24th, will make use of the Wabash. The summer rate for *the round trip* from St. Louis to Detroit is $16.00. Tickets are good for thirty days from date of sale. Tickets will be honored going direct and returning via Chicago or going via Chicago and returning direct, or going and returning via Chicago. For an additional $5.00 tickets will be honored for the boat trip via Mackinac Island and Chicago. The fare for Pullman sleeper, lower berth, is $2.50 each way, direct between St. Louis and Detroit.

Special excursions are sometimes given between St. Louis and Detroit, and it is possible that in this way a much lower rate will be available for the Detroit meeting. Further information can be obtained by applying to H. M. Whelpley, 2342 Albion Place, St. Louis, Mo.

Pacific Coast Points: Round trip tickets to Chicago will be sold only on August 17th, 18th, 20th and 21st for $72.50, good for return until October 31st, with stop over privileges. Tickets sold for one line good for return over any other line, but if members from San Francisco elect to travel by way of Portland over the Shasta route, an extra charge of $17.50 each way will be made.

From Chicago to Detroit the regular rate prevails, which is $5.50 each way, or $11 round trip, or members may on the dates above mentioned purchase excursion tickets from Pacific points to New York and return for $108.50, securing stop over at Detroit for Convention and other stop overs if desired.

Further details regarding rates and routes may be obtained from the nearest member of the Committee on Transportation, whose addresses follow:

COMMITTEE ON TRANSPORTATION.

Thos. F. Main, Chairman..New York, N. Y.
W. Bodemann.....Chicago, Ill.
Wm. C. Alpers.....Cleveland, Ohio
H. M. Whelpley.....St. Louis, Mo.
Chas. G. Merrell.....Cincinnati, Ohio
J. O. Burge.....Nashville, Tenn.
Chas. Caspari, Jr.....Baltimore, Md.
Fred I. Lackenbach.....San Francisco, Cal.
L. A. Seltzer.....Detroit, Mich.
E. Floyd Allen.....Minneapolis, Minn.
F. C. Godbold.....New Orleans, La.
W. S. Elkins, Jr.....Atlanta, Ga.
C. Herbert Packard.....East Boston, Mass.
Lewis C. Hopp.....Cleveland, Ohio
S. L. Bresler.....Denver, Col.

Respectfully submitted,

THOMAS F. MAIN, Chairman.

St. Paul and Minneapolis:—

One way, $13.55.

Round trip, $27.00.

The Great Western and the Milwaukee railroads will furnish a special car for parties of twelve or more.

For further information, write

E. FLOYD ALLEN,
1538 Nicollet St., Minneapolis.

Nashville, Tenn., and other Southern points:—

Memphis, $29.15, via either Chicago or Cincinnati.
Chattanooga, $24.55, via Cincinnati only.
Knoxville, $22.25, via Cincinnati only.
Nashville, $22.75, via either Chicago or Cincinnati.
Louisville, $15.25, via Cincinnati only.
Frankfort, $15.25, via Cincinnati only.
Lexington, $14.70, via Cincinnati only.

These tickets are on sale daily up to and including September 30th, good returning October 31st and permit of liberal stop-over privileges.

For further information, apply to

DR. J. O. BURGE, or GEORGE E. HENRY,
District Passenger Agent, Nashville, Tenn.

The world will little note or long remember what we say here, but it never can forget what they did here. The brave men, living or dead, who struggled here have consecrated it far above our power to add or to detract.

It is for us, the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us; that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that this Nation, under God, shall have a new birth of freedom; and that government of the people, by the people and for the people, shall not perish from the earth.—*Lincoln at Gettysburg.*

Book Reviews

DIGEST OF COMMENTS ON THE PHARMACOPOEIA OF THE UNITED STATES—(Eighth Decennial Revision), and on the National Formulary, (Third Edition), for the Calendar Year Ending December 31, 1912. By Murray Galt Motter and Martin I. Wilbert, Washington Government Printing Office, 1914.

This volume is one, which, however valuable in other ways, is not, at all, true to its name, "A Digest of Comments on the U. S. P. and N. F.", because it contains so much matter foreign to its title that it seems but a cloak,—for a book, which really is a schedule of miscellaneous articles which have appeared in the press, without regard as to whether the subject referred to, was included in either of the volumes mentioned in its title. For instance, on page 76,—to open the book at random,—are found the following references:—

"Progress in Gas Analysis during 1911.

"Review of Progress in Stoichiometry.

"A Report on the Progress of Pharmaceutical Chemistry, etc.

"A Review of the Progress in Pharmaceutical Chemistry.

"Progress in Pharmaceutical Chemistry during 1911.

"A Note on Sampling.

"The Various Analytical Researches on Ions.

"The Influence of the Solvents on the Rapidity of Reaction.

"Pharmacists and Physicians Have Been Entirely Too Lax in Demanding the Purest and Best Drugs in Combating Disease.

"Many manufacturers and physicians have not much use for 'adulterated,' they prefer the word 'technical,' which means the same and is not so harsh.

"There is more adulteration, and certainly more misbranding, among drugs today than there is to be found among food products.

"A brief discussion of the general topic of drug adulteration, for which the cure suggested is education and standardization."

It is difficult to understand how any of these references can be included in a book bearing the title "A Digest of Comments on the U. S. P. and N. F.", for none of them refer in any way to either volume, or to its preparations, and the same is true throughout the whole manual, page after page containing nothing referring to either book.

"The Digest of Comments" on the U. S. P. and N. F.", as originally planned, was one which should include comments, favorable or unfavorable, concerning the contents, make-up, processes, formulas, manipulations, etc., of these two important books, and a treatise, if worked out along those lines, would prove of immense advantage to the profession, but such comments, if they are contained in the volume in question, are so overlaid and covered up by extraneous matter that their value is entirely destroyed.

It is much to be desired that "A Digest of Comments," true to its name, should be prepared and kept up-to-date, as a help to all interested in the two volumes, and, at the same time, we trust we may be pardoned for suggesting that further issues of the pamphlet under discussion should be published under a title more descriptive of its contents.

Scientific Section

Papers Presented at the Sixty-First Annual Convention

A NEW UTERUS-CONTRACTING METHOD OF TESTING ERGOT,—WITH COMPARISON WITH THE BLOOD-PRESSURE METHOD.

PAUL S. PITTENGER, PHAR. D., AND CHAS. E. VANDERKLEED, PHAR. D.

It is well known that non-striated muscular tissue exhibits automatic (spontaneous) rhythmic contractions. It is also well known that certain drugs have the power of stimulating and thereby increasing these normal muscular movements. Various methods of standardizing ergot have been devised and employed by competent pharmacologists utilizing these facts. In most cases, however, the muscle was suspended in oxygenated Ringer's solution, contained in a Harvard muscle warmer with a capacity of about 40 cc. and in practically all cases the Harvard light muscle lever was employed for recording the contractions.

The non-concordant results obtained by other workers with isolated uteri have been ascribed to the interference of spontaneous contractions and the increasing irritability of the muscle tissue under the continued influence of the drug. These two factors form the principal objections to uterine methods. Pharmacologists have therefore endeavored to overcome these objections by selecting the uteri of animals manifesting the *least degree of normal movements*, —preferably those of the cat. To illustrate, Edmunds and Hale, in reporting their observations upon the non-pregnant uteri of cats, state in Bulletin 76, Hygienic Lab. U. S. Pub. Health and Marine Hospital Service: "It is true that the uteri of young cats which may be perfectly quiet in the earlier stages of an experiment after some time may begin to contract spontaneously and increase the difficulty of making comparisons of the effects from successive injections of the drug." In such cases, the authors state, "it may be necessary to employ as a standard the smallest amount which will clearly influence these movements, as, for example, by delay in the relaxation."

The uteri best adapted to our method, on the contrary, are those which manifest a *high* degree of normal spontaneous movements, preferably those of a non-pregnant guinea-pig, weighing between 275 and 325 gms. Instead of employing a Harvard light muscle lever we attach the free end of the uterus by means of a silk thread to one side of an escapement wheel, to the other side of which is suspended a counterpoise bucket for holding shot. By adding the proper amount of shot to this bucket the operator is enabled to weight the uterus down and thus reduce the amplitude of these movements so they can be controlled. Thus the marked spontaneous contractions can be reduced until the uterus is just able to contract under the increased load, or in other words, shot is added until the maximum amount of work that the uterus is normally capable of performing

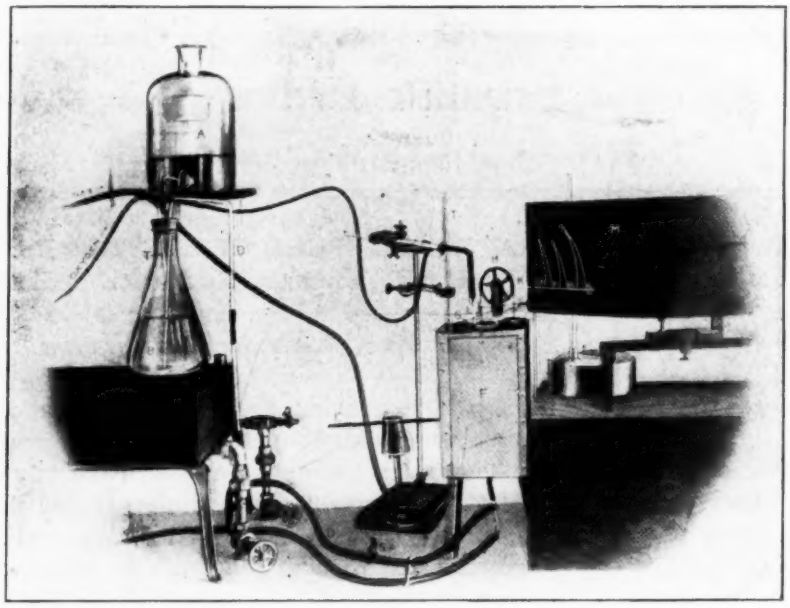


FIGURE 1.—Arrangement of the apparatus employed.

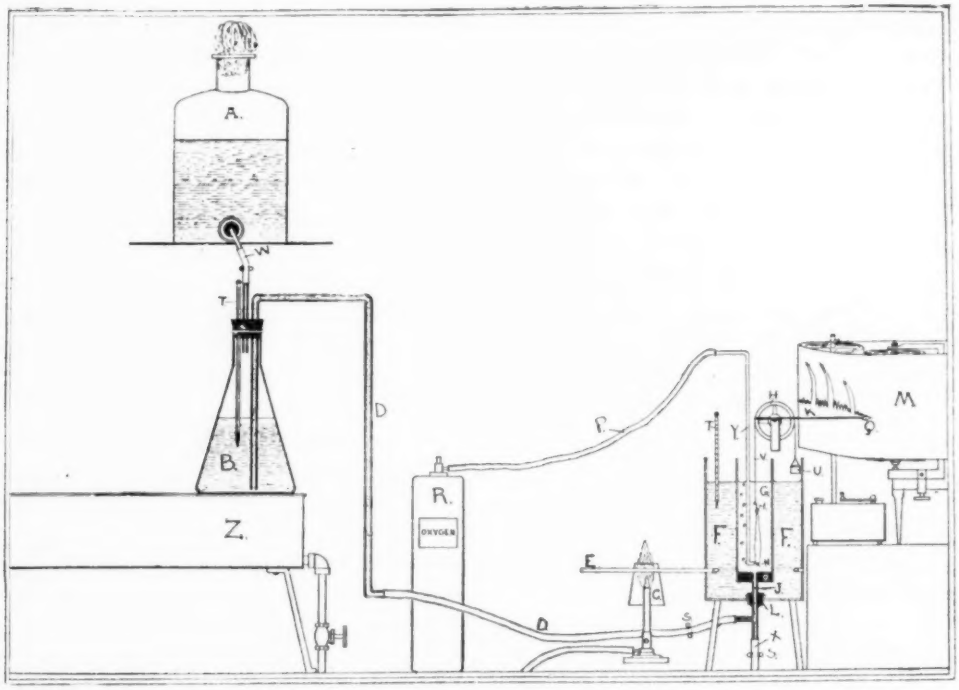


FIGURE 2 is a graphic drawing of the apparatus and will serve to illustrate the following detailed outline of the method which we employ.

is counterbalanced. Any increase in the amplitude of the contraction after the addition of a given drug can now be produced only by that drug.

As is to be expected, the addition of weights necessitates the employment of larger doses of the drug in order to produce marked contractions but, on the other hand, the resultant contractions are more nearly parallel to the doses given. (See Figure 4).

The uterus is suspended in about 250 cc. of Ringer's solution contained in a cylindrical glass vessel (G), the lower end of which is plugged with a rubber stopper (O) having a central bore. Through the latter passes one arm of a wide glass "T" tube (J) which ends flush with the upper surface of the stopper, so that the cylindrical vessel may be completely emptied. This tube passes through a second rubber stopper (L) which fills an opening in the bottom of an outer metallic vessel (F) which forms a constant temperature water jacket.

The temperature of the water in the jacket is kept constant by means of a metallic rod (E) which penetrates the wall of the jacket, passes through the water, and is soldered to the opposite side of the jacket. The portion of the rod external to the jacket is heated by a protected Bunsen burner (C) which slides on the rod. The temperature is regulated by sliding this burner backward and forward until that point is reached where the amount of heat transmitted by the rod to the water inside is sufficient to keep the thermometer (T) suspended in the water at the proper degree (38° to 39° C.)

One of the other arms of the "T" tube is connected by a rubber junction (X) armed with spring clamps (S) to a waste pipe by which the cylindrical glass vessel may be emptied.

The remaining arm is connected by a syphon tube (D) to a flask (B) which holds a small amount of Ringer's solution for refilling the cylindrical vessel. This flask is kept at a temperature between 40° and 45° C. by means of a steam bath (Z). The main supply of Ringer's solution is contained in a large aspirator bottle (A) connected with the small flask by a rubber tube (W), the object being to avoid exposing the reserved solution to prolonged heat. Heat causes Ringer's solution to gradually decompose and lose CO_2.

The Ringer's solution in the small flask should be reduced to 39° C. immediately before admitting it to the cylindrical vessel by allowing sufficient cold solution to run into it from the aspirator bottle.

Into the cylindrical vessel containing the Ringer's solution dips a narrow glass tube (Y). This tube is turned at right angles about half an inch from its lower end. Into this is sealed a platinum pin (N) for attaching the *lower end of the isolated uterus*. The upper end of this tube is connected by means of rubber tubing (P) to an oxygen reservoir (R). A constant stream of oxygen is allowed to bubble through a small vent at the lower end of the tube, thus preserving the muscular irritability of the uterus and at the same time stirring the Ringer's solution.

The other end of the uterus is fastened to a small platinum hook (I) connected to a silk thread (V) which passes over an escapement wheel (H) and is attached to a pin on the opposite side of the wheel. A counterpoise bucket for holding shot (U) is attached to the opposite side of the wheel. To this wheel is soldered an stylet of aluminum (K); the axle of the wheel serving as

a fulcrum. To the end of this stylet a pen point is fixed (Q) for recording the contractions of the uterus on the revolving drum of the kymograph.

Method of Procedure.—The animal is bled by quickly severing the carotid artery with a sharp-pointed scissors. The spinal column is then severed with a strong scissors. One horn of the uterus is then quickly excised together with the ovary which is left attached by means of the fold of broad ligament in which the Fallopian tube runs. This horn is then quickly transferred to the oxygenated Ringer's solution in the cylindrical vessel and attached to the two platinum pins above referred to (the ovary is fastened to the hook suspended from the escapement wheel and the lower end of the horn is fastened to the pin at the lower end of the oxygen tube). The manipulation and exposure followed by the immersion in the warm solution will almost invariably produce a high degree of tonus, which, however, gradually diminishes until the uterus returns to its normal condition. If at this point the uterus does not exhibit *strong* rhythmic contractions it should be discarded and replaced by a new one. The weights are now added by dropping shot into the bucket *until the uterus can make only small rhythmic contractions.*

Conditions are now suitable for determining the activity of the drug to be tested or standardized. The samples to be tested are first freed from alcohol by evaporation on a water bath and then made up to their original volume with water.

A small dose (0.3-0.5 cc.) of the standard preparation is now pipetted into the Ringer's solution in which the uterus is suspended. If all conditions are ideal the uterus which was recording small rhythmic contractions will now forcibly contract and record its contractions by a long sweeping curve. After the curve reaches its maximum and commences to decline (which may require from 5 to 15 minutes) the medicated Ringer's solution is quickly run off and replaced by fresh solution, previously adjusted to the proper temperature. The momentary exposure to the air while changing the solution generally causes the uterus to contract rather forcibly, thus markedly increasing the amplitude of the curve produced by the action of the drug. It is necessary, therefore, in changing solutions to hold the escapement wheel for a few seconds or until the uterus is again covered with the saline solution. This will prevent the record from being interrupted by contractions not produced by the drug. The curve now quickly returns to normal and the uterus containues to record its small rythmic contractions.

Should the uterus chance to be a *very sensitive* one, a dose of 0.5 cc. of the standard preparation may produce a contraction so strong that it will carry the writing pen off the smoked chart. In such cases it is necessary to reduce the dose. If, however, the uterus still continues to give such marked contractions, shot should be added until the contraction can be controlled. On the other hand, should a dose of 0.5 cc. not produce contraction, the dose should be increased to 1 or 1½ cc. If, however, doses of 1.5 cc. do not call out contractions, shot should be removed until a marked contraction is produced by these doses.

After thus adjusting the apparatus two successive doses of equal amounts of the standard solution should be given. If the resultant contractions are equal the uterus is giving concordant results and is ready for assay purposes. In

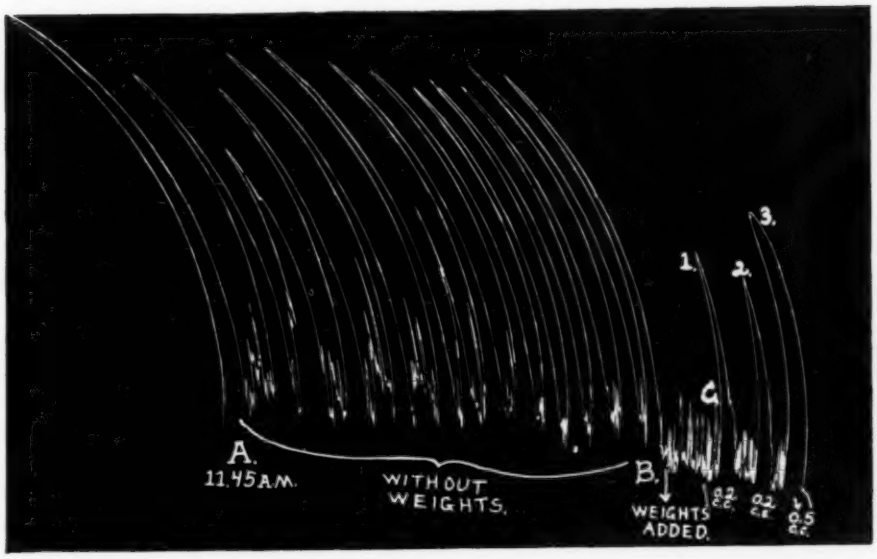


FIGURE 3.—Demonstrates first, the normally acting uterus (A to B); second, the action when weighted down by shot, (B to C); and third, the action of ergot on the uterus when loaded and working against resistance (1, 2 and 3).

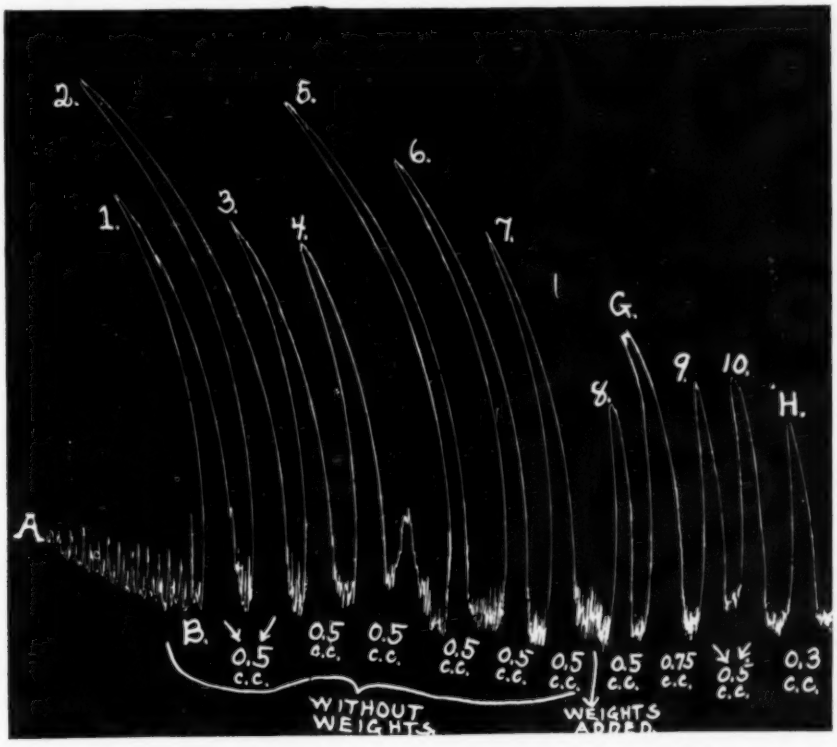


FIGURE 4.—Demonstrates first, the normally acting uterus (A to B); second the *non-concordant* results produced by repeated doses of the same amount of fluid extract ergot (1, 2, 3, 4, 5, 6 and 7); third, the *concordant results obtained after the uterine contractions are controlled by weights* (8, 9 and 10). The curves G and H indicate the quantitative results obtained by a larger and a smaller dose.

order to determine the relative activity of an unknown preparation it is now merely necessary to give progressively increasing or decreasing doses of the unknown preparation until that amount is found which will produce contractions of an equal amplitude as those produced by the standard preparation.

Description of Charts.—The terms "no weights" and "weights added" used in this paper refer to the shot used in inhibiting the normal contraction of the uterus, not to the counterpoise employed to keep the uterus suspended in the Ringer's solution.

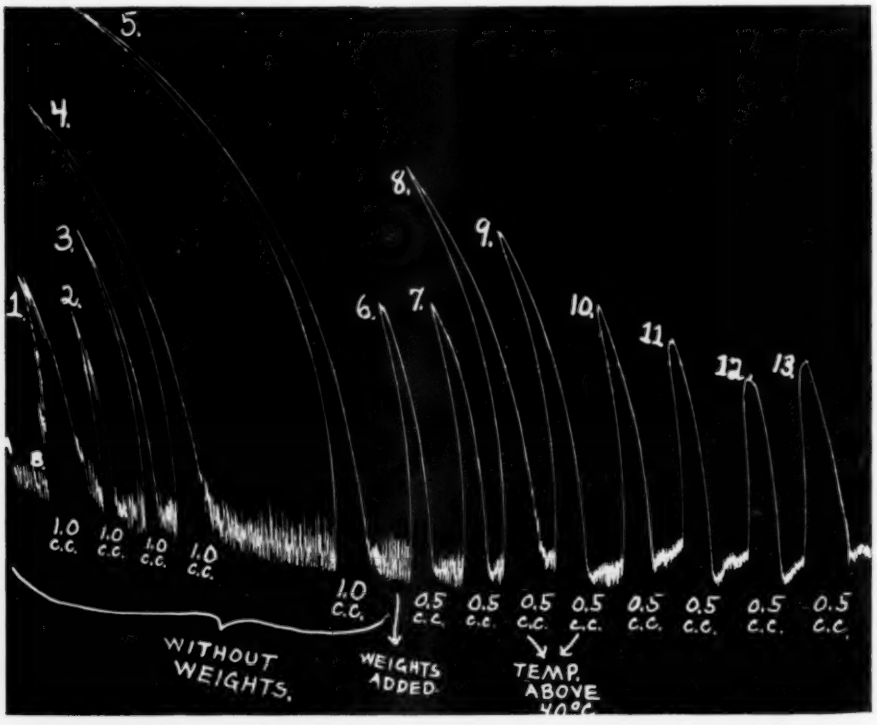


FIGURE 5.—This illustration is similar to Figure No. 2. A to B show normal contractions; 1, 2, 3, 4, and 5, show non-concordant results obtained without weights; 6, 7, 10, 11, 12, and 13, show concordant results obtained after weights were added. The curves 8 and 9 indicate contractions produced under increased stimulation due to a rise in the temperature of the Ringer's solution, and show the necessity for maintaining an even temperature during the experiment.

During our experiment we were greatly impressed by the differences in the uteri as to power and muscular structure, and their mutual relation. Some specimens were greatly deficient in muscular substance and acted feebly. Other specimens showed greater muscular development and contracted strongly. Some of the specimens proved absolutely inert and would not respond at all. After more extended experience, however, we found that the normal activity practically runs parallel to the amount of muscular tissue present; the "stringy" uteri are all deficient in normal activity and in response to stimuli, while the thick, more muscular uteri are practically all active and sensitive. This knowledge enables us to save considerable amounts of time as it renders it pos-

sible for us to distinguish between active and inactive uteri before connecting them with the apparatus.

Having at one time a series of unsatisfactory results which extended over a period of one week, we were at a loss as to the cause of this sudden change in the efficiency of the test. After careful investigation, however, we found that our stock of Ringer's solution was unsterile and showed bacterial growths. New solution was made and placed in sterile containers, after which our results were again concordant. This emphasizes the necessity for keeping both the solution and syphon tubes in a sterile condition.

Due to the marked difference in the sensitiveness of the various uteri, it is

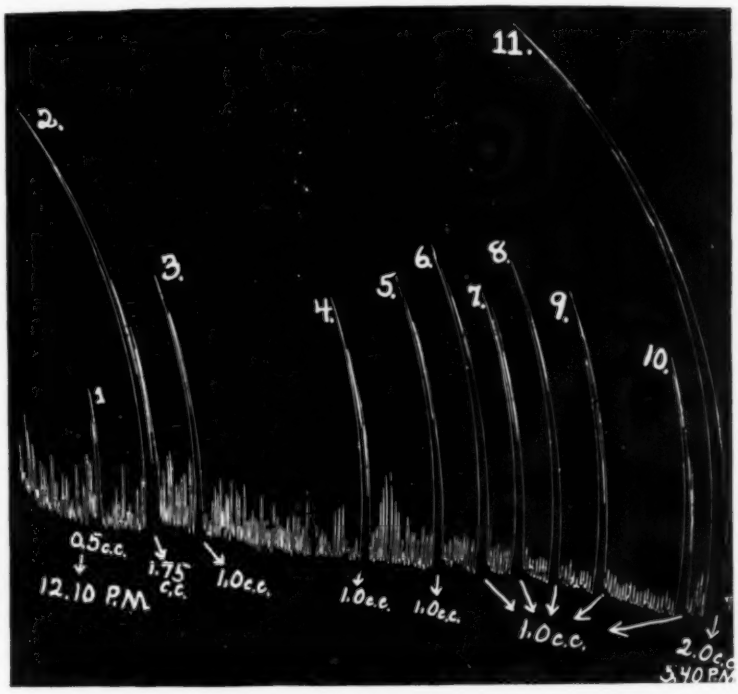


FIGURE 6.—This chart clearly demonstrates the concordant results from repeated doses of an equal amount of fluidextract ergot, 3, 4, 5, 6, 7, 8, 9, and 10; 1, 2, and 11, indicate the quantitative results obtained by varying the doses and demonstrate the accuracy of the test.

necessary to employ a standard preparation with which to compare the unknown preparations. These comparisons must, of course, always be made on the same uterus.

As a standard we employ a fluidextract or ergot of such strength that when injected intravenously into a series of three or more dogs, it produces an average rise in blood pressure of 30 mm. of mercury. After preparing a standard preparation of the above strength it is placed into 4 cc. vacuum ampoules to prevent deterioration. These can then be opened and used as required.

The marked sensitiveness of this method, together with the concordant results obtained by the same, led us to believe that by its use we could perhaps ascertain whether or not the uterine and circulatory actions of ergot run

parallel to one another. This is an important factor, since the blood pressure method is rather extensively used for standardization purposes, its employment being supported by statements that the characteristic effect of ergot is a stimulation of all unstriped muscle tissue of the body, and that the changes in the circulation, in the intestines and in the uterus are but a part of one general action. The employment of this method has been further supported by the fact that all of the substances which have been suggested by various writers as the active principles of ergot have produced stimulation of the blood-vessels as well as of the uterus. So far as we are able to learn, however, no experimental results have ever been published to show whether or not these two actions run parallel.

We are, therefore, now testing every sample of ergot submitted for assay by both the uterine and blood pressure method. By this means we will be able after a sufficient number of samples have been tested to compare the results obtained and thus determine whether or not a parallelism does exist between these two actions. If on completion of our experiments the results show that all the samples which assayed high by the blood pressure method also assayed high by the uterine method we will know that these actions do run parallel. If, on the other hand, some samples run high by one method and low by the other, we will know that such a parallelism does not exist.

Up to the present time we have made comparisons with seven samples with the following results:

Preparation.	Comparative strength by B. P. method.	Comparative strength by uterine method.
No. 1 F. E.	166%	170%
No. 2 Cornutol	100%	90%
No. 3 F. E.	153%	148%
No. 4 F. E. 5 mo. old	51%	100%
No. 5 F. E.	224%	230%
No. 6 F. E.	210%	198%
No. 7 F. E.	118%	105%

The above table would indicate that a parallelism does exist between the action of ergot upon the circulatory system and the action upon the uterus. We will, however, be unable to arrive at a definite conclusion until more data has been compiled.

We will, therefore, continue our investigations along these lines for another year.

RESEARCH LABORATORY OF H. K. MULFORD COMPANY, July 28, 1913.

THE PROPOSED LIST OF USEFUL REMEDIES.*

M. I. WILBERT, WASHINGTON, D. C.

For more than a decade men who are genuinely interested in the development of pharmacy as a recognized and necessary branch of medicine, have viewed with alarm the ever-growing accumulation of disparaging evidence, on the part of national and state food, dairy and drug officials, and have urged upon the fellow-

*Read before the Scientific Section at the Nashville Meeting.

members of their craft a more active propaganda to secure for true pharmacy the recognition and respect that is properly due it for services rendered. These seers, dreamers and reformers have, however, up to the present time, railed in vain and some indeed have passed on to their final accounting without even the flicker of a promise that pharmacy,—the pharmacy which they loved so well and for which they sacrificed their all,—would ever again resume the comparative position of honor accorded it in the earlier days of medicine.

Unfortunately, too, it must be admitted that pharmacy in European countries,—to which we have in the past looked, with something akin to awe, for inspiration and support,—appears to be undergoing a degenerative commercialization, and in Germany, particularly, many of the followers of the craft have undertaken to vie with larger manufacturers in the production of proprietary remedies of little or no value. To such an extent has this commercialization of German pharmacy and pharmaceutical chemistry been developed, that members of the medical profession of that country have felt compelled to institute a Commission or Committee on New Remedies, with objects similar to those of the Council on Pharmacy and Chemistry of the American Medical Association. This Commission, though working along somewhat different lines from those laid down by the Council on Pharmacy and Chemistry in our own country, is destined to bring about a decided change in the methods of marketing proprietary remedies in Germany, and the objections already recorded in medical and pharmaceutical journals, evidence the fact that the work is opportune and that it is meeting with the approval of medical men.

It will generally be admitted that the fundamental object of pharmacy is to maintain the purity and efficiency of the medicines used for the treatment of disease. If this truism be accepted as law, then any person or any collection of persons not in accord with it, as the essential principle of pharmaceutic practice, must, of necessity, be considered as being out of harmony with the interests of true pharmacy, and unfriendly to the real object of our vocation. That there is considerable difference of opinion in regard to the maintenance of the accepted efficiency of materia medica products by the votaries of pharmacy, is evidenced by the fact that many pharmacists, or so-called pharmacists, aver that it is their duty to supply the medicaments asked for, without making any serious effort to differentiate between good and indifferent remedies or between efficient and inefficient methods of administering them. This purely servile attitude has prevailed altogether too long in American pharmacy and was branded as one of its essential shortcomings by the institution of the Council on Pharmacy and Chemistry of the American Medical Association some eight years ago.

Despite the fact that the American Pharmaceutical Association, as an association, has never taken an active interest in the work of the Council on Pharmacy and Chemistry, individual members of this Association have, from the very origin of the Council, taken a prominent part in its evolution and development. In the course of time, the work of the Council on Pharmacy and Chemistry has developed, and in place of involving, as formerly, principally questions of pharmacy or pharmaceutical chemistry, the problems under consideration to-day frequently involve questions of bacteriology, pharmacology and practical therapeutics, and the *personnel* of the Council has of course materially changed. De-

spite this fact, however, even at the present time fully one-half of the members of the Council on Pharmacy and Chemistry of the American Medical Association are also members of the American Pharmaceutical Association.

The origin and object of the Council have been discussed at length in the pages of the Journal of the American Pharmaceutical Association (v. 1, p. 39), and those of our members who are interested, will find a recent *resume* of its activities by Torald Sollmann, in the Journal of the American Medical Association, (July 15, 1903, v. 61, p. 5-7).

The main object of the Council on Pharmacy and Chemistry has well been defined as the general reformation of what is debased and debasing in the present status of drug therapy, and in the course of their work, the members have become convinced that a very fair proportion of the physicians of the country are desirous of securing authoritative information regarding the present status of all remedies, and are quite willing to accept reasonable opinions regarding the value or uselessness of official, as well as of non-official medicaments. To establish an authoritative compend of widely used drugs, the Council has endeavored to compile a list of really useful remedies. Such a list, it was thought, would be of great practical value as a factor in advancing drug therapy along scientific lines, as well as in combating the evils of nostrums of all kinds. It was also thought that such a list would be of use as a basis for instruction in materia medica subjects in medical schools, and as a reasonable limitation for examinations in materia medica subjects, by state medical examining boards.

With the very limited amount of time that can be devoted to materia medica, in the present-day curriculum of medical schools, it is evident that it would be practically impossible to teach all that is known of the five thousand or more drugs and preparations comprised in the several pharmacopœias of the world, to say nothing of giving even the most superficial survey to the countless hundreds of articles mentioned in dispensatories and other books of reference. Thorough instruction regarding the properties, uses and limitations of a reasonable number of widely used medicaments, it was argued, would serve to give to the prospective practitioner of medicine a reliable foundation in materia medica subjects, on which he would be able to develop a practical and safe materia medica for himself.

A list of useful remedies, to serve the purposes outlined above, should include all articles regarding which a prospective graduate from a medical school, or a reasonably well informed medical practitioner, might be expected to have a fair amount of information. With the constant, and at times rapid, changes in our knowledge regarding the possible action and uses of drugs, this list must, of necessity, be more or less ephemeral, and be modified, from time to time, so as to include only the articles that are being actively used and discussed in all sections of the country, if not in all parts of the world.

A tentative list of important medicaments was compiled in 1908, under the direction of the Council on Medical Education of the American Medical Association, by the Sub-committee on Pharmacology, Toxicology and Therapeutics. This list was later submitted to the National Federation of State Medical Examining and Licensing Boards, who endorsed the principle involved and appointed a special committee to compile a list adapted to the needs of state medical

examining boards. From this latter list, the Council on Pharmacy and Chemistry, through the Sub-committee on Useful Remedies, compiled a preliminary list of widely used articles, and this list was then sent to teachers of pharmacology and therapeutics in medical schools and colleges, to deans of medical schools and colleges, to the secretaries and some of the members of state medical examining boards, and to a number of medical practitioners who were thought to be interested in the subject. The replies received from these several sources were compiled, and the revised list was subsequently submitted for discussion and additional comment, through the pages of the Journal of the American Medical Association.

So far as practicable, in the present knowledge of the usefulness of medicines in therapy, an effort has been made to include in the list of useful remedies, only such drugs as are generally acknowledged to have superior medicinal value, or which, because of their supposed value, are still in general use in all parts of the United States. This principle does not, of course, exclude drugs regarding which pharmacologists have decided opinions as to their worthlessness, but it does limit the inclusion of such drugs to a reasonable number, and it may properly be expected that, in the near future, reliable clinical observations will definitely prove the value or uselessness of the limited number of drugs of this kind.

How successful the Council has been to compile a really international list of useful remedies, is evidenced by a comparative review of the present list with the articles included in the several well known pharmacopœias of the world. The total number of titles and headings in the present list can be classed as follows:

Drugs or chemicals	231
Preparations	173
Class definitions	43
Cross references	13

Of the 231 titles of drugs or chemicals, all but one, salvarsan, N. N. R., are included in one or more of the now existing pharmacopœias and, of the remaining number, again, all but one, phenolphthalein, are included in two or more of the now official pharmacopœias. The recognition accorded the several articles in 16 national pharmacopœias is approximately as follows:

95 are included in all 16 pharmacopœias.
80 are included in from 10 to 15 pharmacopœias.
27 are included in from 5 to 9 pharmacopœias.
25 are included in from 2 to 4 pharmacopœias.
1 is included in but one pharmacopœia.
1 is not official at the present time.

The object of bringing this matter to the attention of the members of the Scientific Section of the American Pharmaceutical Association, is to point out that much, if not all, of the dissatisfaction with established medicaments, may be due to the fact that, as they reach the patient, they are not strictly in accordance with the requirements of the Pharmacopœia.

This rather bold, bald statement may be questioned by some, but when it is remembered that, for a decade or more, incontrovertible evidence to this effect has been accumulating, and is readily available, it would appear that the

rational course for pharmacists to pursue would be to assist in correcting existing evils and to insist that all readily controlled drugs be sold or dispensed only in full compliance with established standards.

It will generally be admitted that, under present-day conditions, it is impracticable, adequately, to control, by chemical or other means, all of the many drugs and medicines dispensed on physicians' prescriptions. With the establishment of a reasonably limited list of drugs and preparations, however, it would be possible for the pharmacist to comply with the requirements of established standards and to satisfactorily control the identity and purity of the medicaments so listed. Such a limited list of substances would also facilitate systematic study of the deterioration or changes of drugs and preparations and the methods best suited for preventing them. How little we really know of the chemical behavior of even the best known drugs and preparations has again been emphasized by Neuberg and Shewket (Biochem. Ztschr., p. 495-501), who, in a report of studies on changes in medicaments caused by light, call attention to the possible photochemical action of iron, and point out that solutions of otherwise indifferent materials may be decomposed by light, in the presence of salts of iron, into physiologically active substances. The possibilities suggested by this report alone, offer material for study for many years to come, and this study, if concentrated on a reasonably small number of drugs and preparations, would yield practical results of value to the medical practitioner of the future.

In conclusion, I will venture the assertion that the active coöperation of the various branches of pharmacy, in protecting a reliable materia medica, will tend to strengthen the faith and reliance of medical practitioners in really useful remedies, will assist in eliminating perfunctory drugging with useless mixtures, and will lead to a rational, scientific study of the action of drugs on the healthy and on diseased organisms, and thus serve to place drug therapy on a reasonable and secure foundation for all time to come.

DISCUSSION.

Wm. Mansfield, of New York, said that he thought the use of vegetable drugs in the last fifty years had been increasing gradually in this country, and all over the world. He was in touch with a great many people interested in these things, and was sure that there was a movement going on to bring back vegetable drugs. He believed that, while this list was helpful, it was really not a restricted list, but a prepared list, which included standards of purity, tests of identity, for every drug and preparation used in medicine. He thought the person in a small country place, who bought a few pounds of drugs, was as much entitled to receive pure drugs as the man manufacturing thousands of pounds. The interests of such men should be taken into consideration, as well as the results of the comparatively few men in the laboratory.

In response to a question by Mr. Murray, Mr. Wilbert said there was a larger book in process of publication now. He believed this was to be obtained, at the present time, from the offices of the *Journal of the American Medical Association.*

Continuing, Mr. Wilbert said that the paper would serve to record an effort to get at the things most used at the present time and to secure reasonable uniformity.

Section on Historical Pharmacy

Papers Presented at the Sixty-First Annual Convention

THE TABLET INDUSTRY—ITS EVOLUTION AND PRESENT STATUS.

Continued from Page 848, June issue.

L. F. KEBLER, PH. C., M. D.

BASES.

These are cane sugar, milk sugar, ammonium chlorid, citric acid, sodium carbonate, and sodium chlorid. When an excipient is used to increase the weight of granulation or the size of a tablet or to facilitate the solubility of an active agent, it is termed a base. Milk sugar, for example, is commonly mixed with certain triturations in sufficient quantities to produce tablets of a given size. Sodium carbonate is a commonly used base in the manufacture of calomel triturates. Milk sugar is now universally employed for the manufacture of molded tablets, not solely for its action as a base, but because of its adhesiveness and the property it possesses of producing tablet of a porous nature, a property of great service in preparing tincture triturates. Mixtures of cane and milk sugars can often be employed to advantage. Ammonium chlorid, sodium chlorid, and citric acid not only add bulk, but facilitate the solubility of corrosive sublimate.

DISINTEGRATORS.

Starch and gelatine are used for this purpose. At one time a mixture of bicarbonate and citric or tartaric acid was employed. The most commonly used disintegrator at present, however, is starch. Its value lies in the property it possesses, when dry, of absorbing moisture and expanding, thus disintegrating the tablet. Such tablets when properly made should fall into powder almost immediately on immersion in water. The amount of starch used varies from 5 to 20 per cent, depending upon the nature of the ingredients. Even after starch was quite generally employed as a disintegrating agent, much criticism on the score of "insolubility" was still forthcoming. The first observation on "insolubility" recorded after Killgore's application for a patent will be found in Arnold's remarks.[46] This observation is referred to by Dieterich.[47] It should be noted, however, that there is a possibility that the knowledge of the properties of starch as a disintegrator had not at that time found its way into Germany. In 1899, J. E. Groff,[48] twelve years after Killgore's discovery, refers to the finding of undisintegrated quinine tablets in the excrement of patients Joseph R. Wood,[49] in 1904, refers to the uncomplimentary term "brickbats," then applied to tablets, largely on the ground of their "insolubility." Such tablets are stated

[46] Corr.=Bl. f. Schweiz. Aerzte, 1890, *20:* 94.
[47] Pharm. Ztg., 1890, *35:* 400.
[48] Am. Drug., 1899, *34:* 196.
[49] Am. Drug., 1904, *44:* 105.

to be distinctly unsafe in typhoid fever. C. S. N. Hallberg,[50] in 1901, made an investigation of the time required to disintegrate tablets in artificial gastric and intestinal juices, with unfavorable results in a number of cases. Some believe that these unsatisfactory tablets were due to inexperience, lack of care, or too much adhesive, but after twenty years' experience some non-disintegrating tablets are still encountered, and the question is being studied. For example, Lowry[51] proposed the use of starch paste, instead of starch, to cause more ready disintegration. The discussion of the paper clearly shows that all of the difficulties in regard to disintegration have not yet been solved. In 1909, H. Dichgans[52] recorded some results where tablets had not disintegrated at the end of twenty-four hours, and Seel and Freiderich,[53] in 1911, reported on tablets which would not disintegrate in water.

Some are of the opinion that the kind of starch used is of the utmost importance; others think that cornstarch is as well adapted for the purpose as potato starch. Very few observations on this point have been published, the most comprehensive being those of Blaschnek,[54] in 1909. His investigation included potato, wheat, corn, rice, and marantha starches. The results clearly show a distinct advantage for marantha and potato starches. These two, according to his observations, seem to run nearly parallel. The point made by this investigator is that the starch must be nearly anhydrous if the best results are desired. The criticism on this point by some is, that if the starch is too dry the tablet has a tendency to disintegrate spontaneously, due to the moisture absorbed from the atmosphere. Blaschnek, however, claims that this criticism is not well founded, though his observation in this direction is not borne out by many other observers. Gelatine acts like starch, but the results are generally unsatisfactory, and it is, consequently, very little used at present. The mixture of a bicarbonate and an acid when immersed in water reacts and gives off carbon dioxide, thus mechanically breaking up the tablet. This method, as far as the writer knows, is not practiced now. Powdered agar-agar and Irish moss have been advocated as disintegrators, but so far they have not been used to any extent.

ABSORBENTS.

These include milk sugar, starch, magnesium carbonate, and powdered licorice root. The purpose of these agents is to absorb moisture or medicated liquids. For example, starch is frequently mixed with extracts, not only to facilitate drying, but also to act as a disintegrator when the material is in tablet form. Milk sugar constitutes the base of most of the hypodermic tablets, is an excellent absorbent, and produces porous tablets. Tablets are medicated homeopathically by simply adding the medication in liquid form and allowing the liquid to evaporate. Magnesium carbonate and powdered licorice root are not so well adapted for absorbing moisture as starch.

LUBRICANTS.

In the compression of drugs difficulty is generally experienced because the material adheres to the punches and dies. Agents used to minimize this diffi-

[50] Merck's Rept., 1901, *10:* 211, 245.
[51] Proc. Maryland Pharm. Asso., 1905, 26, 78; Abstr. Proc. Am. Pharm. Asso., 1906, *54:* 663.
[52] Pharm. Ztg., 1909, *54:* 850.
[53] Med. Klinik, 1911, *7:* 887, 927.
[54] Pharm. Post, 1909, *42:* 169; Abstr. in Pharm. Ztg., 1909, *54:* 178.

culty are called lubricants. A few granular compounds, like sodium bromid, potassium iodid, chloral hydrate and hexamethylamin, do not need lubrication. Dunton included lubricants and certain methods of application in his patent of 1875.[55] The principles announced then still hold to a large extent. A few new lubricants have been added. Those in use at present are talcum, liquid petrolatum (white oil), theobroma oil, boric acid, starch and stearic acid.

Purified talcum is the most common and abundantly used lubricant. It is used both alone and in conjunction with "white oil." The amount varies from one to five percent, based on the weight of the granulation, but the writer has found as much as 30 percent in the finished product. The addition is usually made to the granulation and is never employed in soluble tablets. Talcum is generally added for the purpose of overcoming "picking."

Liquid petrolatum ("white oil") of suitable quality is very generally used, both alone and in conjunction with talcum. It tends to prevent "sticking." About one drachm to each pound is ample. It should be used either not at all in the manufacture of soluble tablets, or as sparingly as possible, because it has a tendency to retard solution and produce milkiness. Dunton advocated the use of paraffin dissolved in a volatile solvent, over twenty-five years ago. The distribution of "white oil," cacao butter, and petrolatum by means of a volatile solvent is not productive of the best results. Experience has shown that the solution penetrates the granules and thus deposits a large part of the lubricant where it is of little or no service; furthermore, it is expensive and not without danger. Talcum and oil are frequently used together to prevent "picking" and "sticking." In analysis the presence of these lubricants should be kept in mind.

Boric acid is the only permissible lubricant for soluble tablets. When rapid solution is required the acid must be applied in an impalpable form. The amount used should never exceed 5 percent except in cases where it is one of the medicaments itself.

Theobroma oil (cacao butter), either alone or in solution, was brought forward in Dunton's patent in 1875, before mentioned. White and Rodwell are frequently given credit for its introduction into the tablet business, but this honor clearly belongs to Dunton.

Starch is not usually classed as a lubricant, although its value and usefulness for this purpose are well recognized.

Stearic acid has been advocated and used, but is not employed to any extent at present in making medicinal tablets. It is used to some extent in compressed confectionery.

FILLERS.

The term "filler" is applied to substances like terra alba, fuller's earth, kaolin, and other inorganic bodies serving the purpose of a base. They are usually considered inert and therefore harmless, but their introduction into the system must be looked upon as decidedly undesirable. Their use in confectionery is forbidden by law, and if they are undesirable for this purpose, why should they be introduced into the stomachs of the sick? There is no excuse for the practice.

Thus, it is clearly shown that the number of ingredients employed in the manufacture of tablets is legion, and all are agreed that it is absolutely necessary for

[55] U. S. Pat. 168240, dated Sept. 28, 1875.

every manufacturer to possess a great deal of knowledge as to their quality and purity, which can be gained only by proper chemical and pharmaceutical supervision.

CHEMICAL CONTROL.

The industry involves a multiplicity of details which must be carefully observed if this form of medication is to be prepared with the uniform composition usually claimed. It is necessary to know the character, purity and composition of the initial ingredients to be used. If this information is lacking it is practically impossible to even approximate in advance of analysis the amount of an active agent or agents in the finished product. The quality of medicinal chemicals available on the market is, on the whole, very satisfactory, but it would be unwise to take for granted that all of these drugs are as represented. Again, a chemical may deteriorate by being kept for an undue length of time or under improper conditions. There may be loss of water of crystallization on account of faulty containers or storage. Greater variation is liable to occur in tablets in which plant extractives are employed. These extractives are often made under the same roof as the tablets, and the possibility of taking chances under these conditions is sometimes greater than when they are purchased outside. On the contrary the quality of a home-made product is well known to the maker, and if it is carefully supervised the chances for deficiencies are diminished. The potent agents in plant products may vary to a great extent. Time is also believed to be an important factor, but this has not been definitely determined in many cases.

The use of different menstrua in extracting plant drugs causes great variation in the finished product. By using different solvents the yield may be doubled, in some cases, without correspondingly increased activity. In fact, the activity is frequently decreased in proportion to the increase of the extractive. The tablets in which such variable drugs are used cannot very well be uniform. The writer realizes that it is practically impossible to place every feature under chemical and pharmaceutical control, but in reality such a course is the only safe one.

SUPPLY AND STORE ROOM.

This is one of the most important units of the business, and should be in charge of a capable, well-trained and experienced man who should check up not only the quality and uniformity, but also the correct compounding of formulæ. In the case of habit-forming agents and expensive remedies he should be designated as the one responsible for their actual introduction. These drugs, particularly the former, may be surreptitiously spirited away, at least in part. Not a single ounce of material should leave this room without an order properly signed, stating the quantity and purpose for which it is to be used. Every formula should constitute an order by itself. It will serve as a useful record and tend to minimize errors. Laxness here has been found to lead to numerous difficulties, as will be shown later. The room should contain several compartments suited for the storage of the various drugs.

TRITURATING, POWDERING, AND MIXING.

Trituration is the process of reducing a substance to a fine or impalpable powder by grinding or rubbing. The substance to be triturated may be simple or mixed. If the several ingredients are triturated separately it will ultimately

be necessary to mix them, and it is believed that a powdering together of the active agents with a part at least of the excipient to be used often produces the best results. The mortar and pestle is the simplest trituratory, and the wedgewood variety is the most generally satisfactory. This trituratory was formerly used almost exclusively. Fairly satisfactory results can be obtained, provided sufficient time and energy are spent. It is, however, applicable only to small batches. Apparatus has been devised for mechanically operating the mortar and pestle. Perfect triturations by this method are, however, few. The small ball mill produces better and more satisfactory results in every way.

Ball and pebble mills. These mills consist of revolving hollow cylinders of iron, steel, porcelain, and, in some cases, the metallic mills are porcelain lined. The trituration is accomplished by balls, usually of the same material, but sometimes hard, flint pebbles are employed. At times the pebbles are eroded, so that the powdered material is correspondingly contaminated. The material, with the balls, is introduced into the cylinder, the cylinder closed and rotated until the drug is of the required degree of fineness. This form of apparatus is very satisfactory for triturating hygroscopic, irritating and poisonous drugs. Porcelain or porcelain-lined mills are most satisfactory, although somewhat more expensive. Iron mills can be used only for powdering material possessing a large amount of color. Porcelain-lined ball mills vary in capacity from a few ounces to fifty pounds. A pot mill is simply a modified form of the ball mill.

Chasers may be considered as modified forms of mortars and pestles. They consist of heavy rollers rotating on a flat surface, or in a trough. These rollers are either of stone or iron. The action is slow but positive and satisfactory. They are suitable for powdering or mixing almost anything. Even white goods can be powdered in them if care is exercised. There is always some elevation encircling the rollers, to retain the material within a certain area. The entire machinery is usually enclosed in a separate chamber to avoid contamination either from the outside or by the spread of powder through a room in the course of powdering. If it is desired to prepare a special, high-grade powder, the rollers are encircled with cylinders of various heights. The higher these cylinders the finer the powder. The principle is that the rollers, in revolving, not only powder the material but also mechanically raise the finer powder in the form of dust, which falls over the side of the cylinder where it collects and can be removed. This form of apparatus is excellently suited for the preparation of high-grade, uniformly fine, soft powders. The method is, however, one of the most expensive, and is employed only for special products.

High-speed mills. For powdering large quantities, high-speed mills are essential. Very satisfactory mills are at present available. The details of construction differ, but the principle of powdering is the same. It lies in the fact that the drug is brought into contact with the beaters at a high rate of speed, varying from 2,500 to 3,000 revolutions a minute. The powder is usually kept in contact with these beaters until it is sufficiently fine to be ejected. From this it can readily be seen that the powdering is done by impact. The material is struck with repeated powerful blows and thus shattered into powder. The fineness is controlled by the rate of speed and by mechanical devices. Various in-

gredients may be simultaneously powdered, and thus mixed, but, as a rule, the several ingredients are powdered separately.

Mass mixers. This form of apparatus is suitable for the mixing of material containing more or less moisture. For example, it is of service in mixing solid extracts with powder, and it may be possible, by this form of apparatus, to mix together a product containing considerable moisture with dry material, so that it may be granulated.

Powder mixers. Various forms are available. The essential features of all are a semi-cylindrical trough, covered with a box-shaped lid, and a metallic spiral for mixing. Sometimes a sieve is placed at the bottom of one end, to guard against the introduction of material too large to pass through the sieve introduced. When two powders of materials of different specific gravity are to be mixed, great care must be taken because of the tendency of the heavier and the lighter powder to separate into layers, thus resulting in mixtures of variable composition. If the milk sugar or other vehicle is included in the mixing operation, the mixture is ready for making molded tablets, but if intended for compression the powder requires granulation.

GRANULATION AND MIXING.

Granulation is essential to the manufacture of satisfactory compressed tablets. It consists in thoroughly mixing the powders with suitable liquids and forcing the slightly dampened mass through a sieve of proper size. The granules thus formed are dried, after which the lubricant, or additional lubricant, is added if necessary, and the granules are again sifted. Certain chemicals come in granular form, or they may be readily granulated by milling and sifting. Before granulation it is important that the powder be reduced to the greatest possible degree of fineness, and that there be perfect mixture. Blaschnek[56] claims that granulation is not necessary. With this view, however, very few agree. No method has yet been devised nor any machine constructed by means of which it is possible to satisfactorily compress fine powders without undue pressure, except in the form of molded tablets. By means of granulation a friable mass is produced, whereas, if powder be compressed, the resulting tablet is hard and difficult to disintegrate, except in the case of soluble chemicals. Even an excess of fine powder mixed with the granulation often interferes with the satisfactory compression of the tablet, and is frequently responsible for undue variation in both weight and composition.

AGENTS OF A VOLATILE OR UNSTABLE NATURE.

One of the most difficult tasks of the tablet-maker is to incorporate in tablet form medicinal agents of a volatile or unstable nature. Among these are ammonium carbonate, camphor, nitroglycerin, salol, the valerianates and essential oils. One method in vogue is to mix all of the ingredients, granulate, and dry the granulation at room temperature as rapidly as possible, thus avoiding loss. In some instances, the manufacturer mixes a larger amount of the volatile drug with the granulation than is actually called for, thus allowing for some dissipation, yet preparing a finished product containing the requisite quantity of the drug. Another method consists in dissolving the volatile drugs in alcohol or

[56] Pharm. Post, 1909, *42:* 170.

some other volatile solvent and mixing the resulting solution with the granulation just previous to compression. This, of course, also requires a certain length of time for the elimination of the solvent. In addition there is great difficulty in uniform distribution by this procedure. For example, it would be very difficult to uniformly distribute throughout the granulation camphor dissolved in alcohol. The probabilities are that a larger proportion of the camphor would be mixed with one part of the granulation than with another part. Even should the distribution in the granulation be fairly uniform, a large amount of volatilization might still occur before the material was compressed. Neither of these procedures gives satisfactory results until the finished article is chemically adjusted.

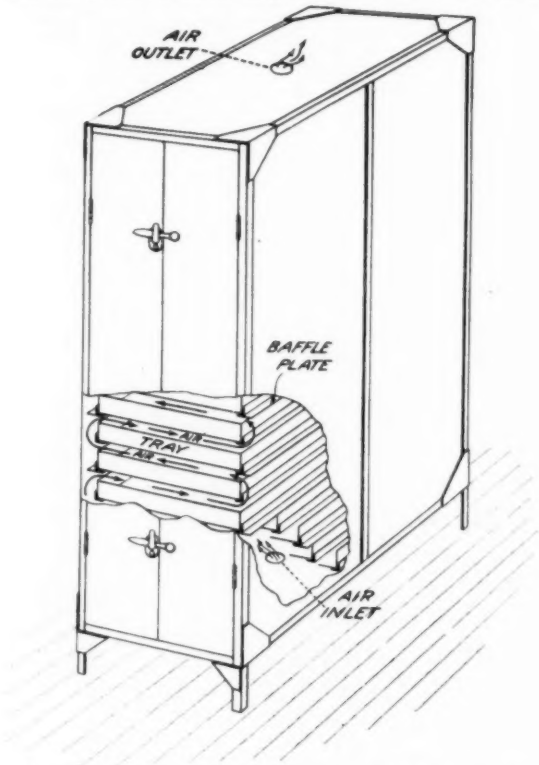


FIG. 19—Design of dryer made by Ralph R. Patch.

Another point to be considered in this connection is the fact that even after the tablets are compressed in suitable form and contain the proper amount of such active agents, there is a probability of loss by volatilization, dissociation or sublimation, resulting in a product differing in composition from the declaration appearing upon the label. In cases of this kind it is best to discontinue the manufacture of such tablets. Dealers are unable to guarantee these products for any length of time, even when the tablets are right at the outset. The claim is frequently made that this line of business is not only unsatisfactory but unprofitable, and the hope is often expressed that medical men might be induced to cease ordering goods of this character in tablet form. One manufacturer claims that even though the business is unprofitable, he manufactures such tablets on request because he desires to hold the patronage of medical men. It is argued that if one manufacturer will not fill prescriptions calling for these commodities, another manufacturer will do so, with the resulting loss of business in other lines. The medical profession should recognize these inherent difficulties and discontinue requests for such goods. If medical men persist in their requests the manufacturer himself will be compelled in self-defense to place upon the packages of such goods labels apprising the purchaser of the situation. They are unable to guarantee the goods to be strictly in accord with the prescription on account of the volatile nature of certain of the ingredients, even though the correct quantities were used at the outset.

DRYERS.

One of the cardinal principles in the successful manufacture of tablets is a thorough drying of the material. Dunton emphasized this feature many years ago. The dampened granules must be dried. Some drugs, both simple and

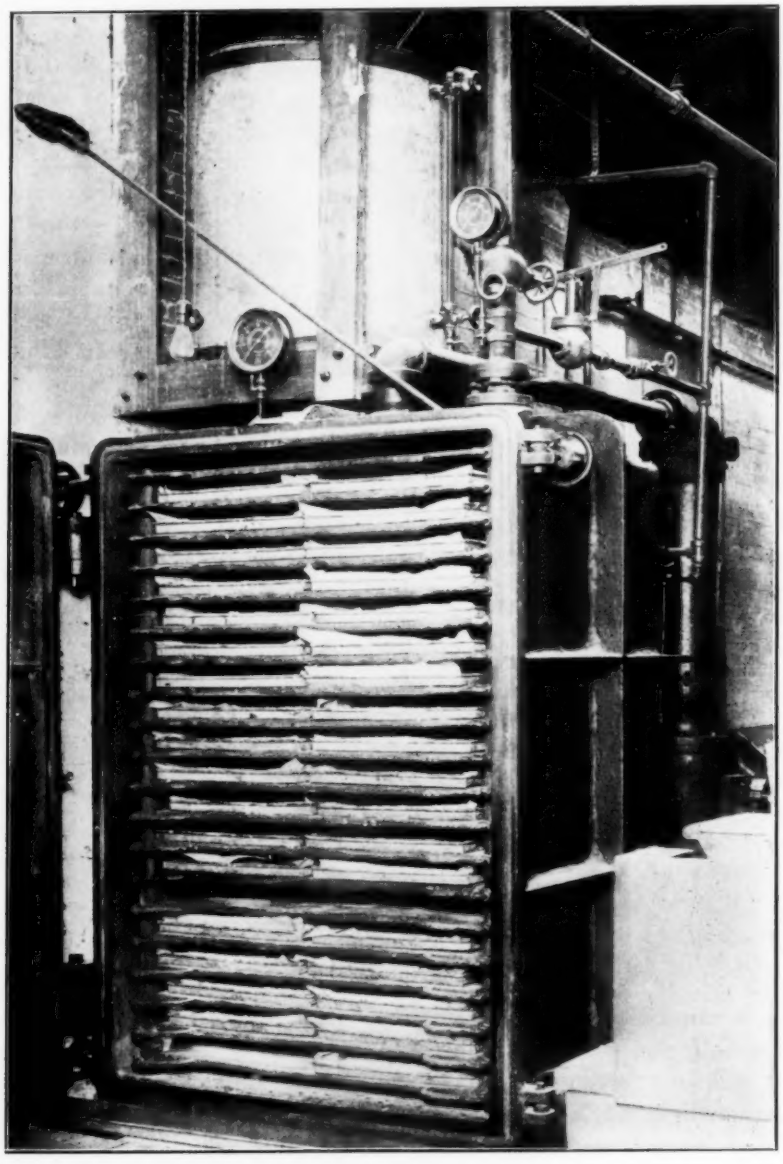


FIG. 20—Vacuum dryer.

mixed, may be sufficiently dried, under favorable conditions, in the open air, but the weather cannot be depended upon and a reliable drier must be used. It should be of the best possible construction and arranged to provide a continuous current of fresh air, at a uniform temperature, which should be under absolute control. This feature has apparently received very little attention in

the past, and is undoubtedly the cause of many shortcomings, particularly in the case of goods of a volatile or deteriorative nature. Such drugs should be dried at the lowest possible temperature. Dryers are usually heated by means of steam pipes coming from the boiler. Check valves are seldom introduced to control the heat. Observations made on some of the dryers show that the temperature varies from that of the room to 100° C., 108° C., 110° C., 115° C. and even to 120° C. The air of some of these rooms is absolutely stagnant. Ventilation and change of air are dependent almost entirely upon the opening and closing of doors, a bad practice for which there is no excuse. The dryer should be so constructed as to introduce the air at the bottom, pass it over the successive trays, and finally emit it at the top. In case the granules are dried on cloth trays, such an arrangement is unnecessary. During the past decade, drying in a vacuum has been greatly improved. In a number of factories, discarded vacuum dryers have been observed, and the management stated that they were not successful. On the other hand, other manufacturers are using vacuum dryers with great success, and hold that their use is of eminent service in the proper drying of granules for compression. The writer has seen in very successful operation one of these vacuum dryers which had displaced a battery of the old form of dryers. By means of this apparatus it is possible to conduct the drying at any ordinary temperature.

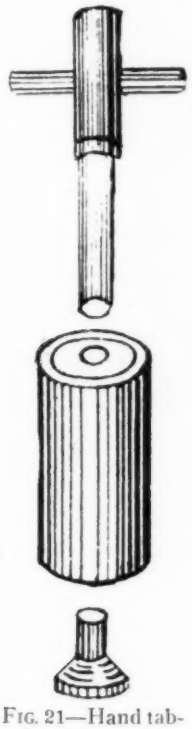


FIG. 21—Hand tablet compressor. (V. L. Kebler)

After a granulation is satisfactorily dried it is again sifted, and the lubricant, or additional lubricant, added. Flavoring agents, such as methyl salicylate, oil of peppermint, and oil of cinnamon, are also usually added at this stage, and the material is then ready for compression.

COMPRESSION OF TABLETS.

One of the prominent claims made for tablets is "uniform dosage and medication." No part of the entire process in the manufacture of tablets requires more care to produce accuracy than compression, and no feature has received greater attention. The machines now on the market are the outgrowth of many experiments to overcome the serious defects of the earlier machine. Devices of an uncertain character have given way to mechanisms of positive action. The simplest form of apparatus is the hand punch and die, useful in prescription work and in cases where only a limited number of tablets are required, but it is of little use at present. A number of hand presses are now serving the same purpose, but their usefulness also is very restricted. The automatic power machines are universally

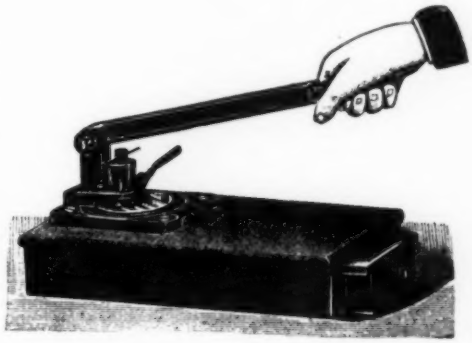


FIG. 22—Hand tablet press. (Ph. Ztg., 1902.)

employed where any number of tablets are required. Of the two types of power machines, the rotary and the vertical punch, both single and multiple, many are advocated. Some do not have a good word for the rotary; others cannot praise it too enthusiastically. The modern rotary will undoubtedly turn out the greatest number of tablets in a given time, although the output of the multiple vertical, of eighteen to twenty punches, is very large. An eighty punch vertical machine has

FIG. 23—Single punch vertical tablet machine (Stokes and Company).

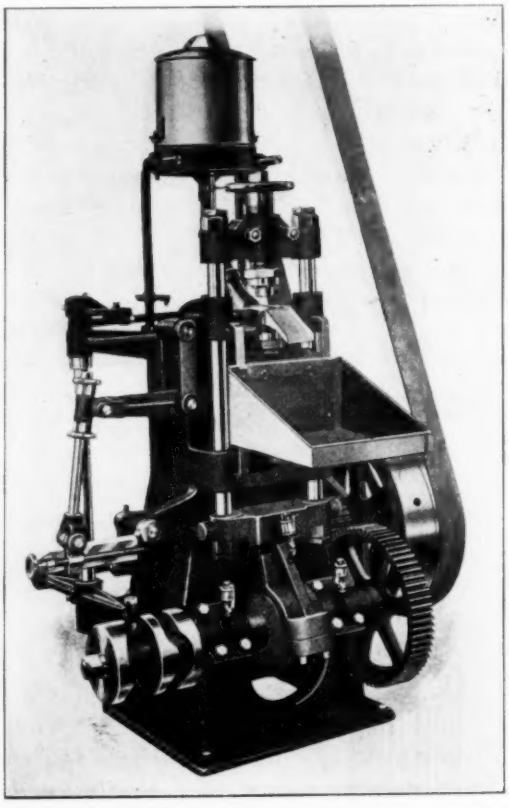


FIG. 24—Richards multiple punch vertical tablet machine.

recently been constructed. The first desideratum is a uniform tablet, and it is believed by many that the single punch machine has something in its favor in this direction, because there is less adjustment and alignment of punches and dies. The next essential is to prepare a tablet of such weight that the number actually produced from a given amount of granulation agrees very closely with the theoretical calculation. For example, if a formula calls for 500,000 tablets, the operator must determine the size necessary to produce approximately the theoretical number, including waste and loss. An experienced worker is able to do this very quickly.

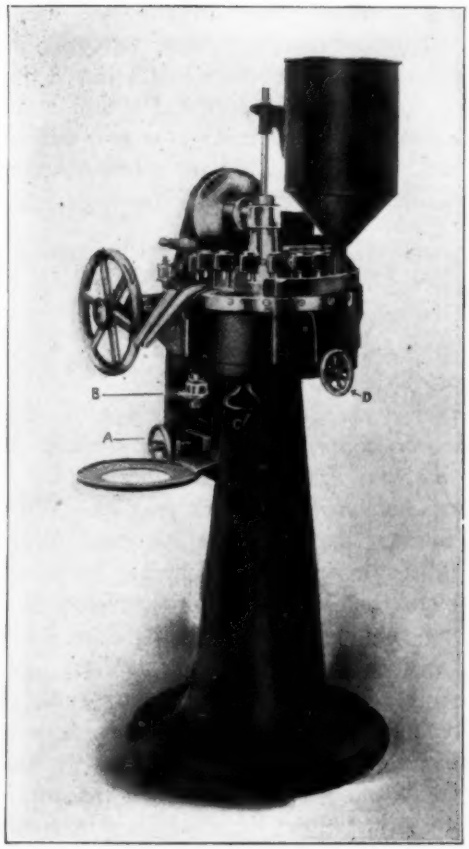


FIG. 25—No. 2 rotary tablet machine (Colton Company).

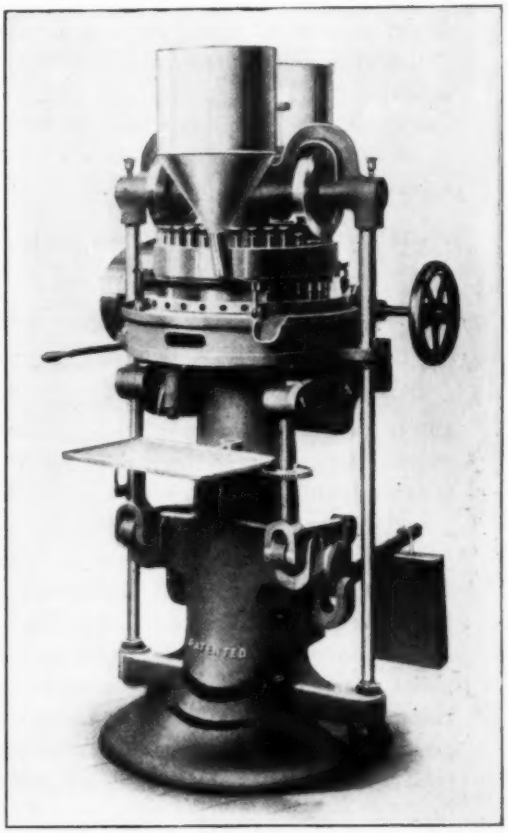


FIG. 26—Clark rotary tablet machine (Stokes Machine Company).

VARIATION IN WEIGHT OF MEDICINAL TABLETS.

A natural query at this point is, "How closely do the theoretical and practical yields agree?" On this operators are usually too enthusiastic. When the question, "How near, in practice, do you come to the calculated?" is put to them, the almost invariable reply is, "Two percent." Some admit that the variation may run as high as 3 percent, but not one has ever admitted that the variation might run as high as 5 percent, either above or below the number calculated. The writer has been shown formula after formula where the theoretical and actual yields are identical. Only a little thought will convince any one that such a feat is a rare exception. Data of this character must be taken with a grain of salt. It is very common not to take account

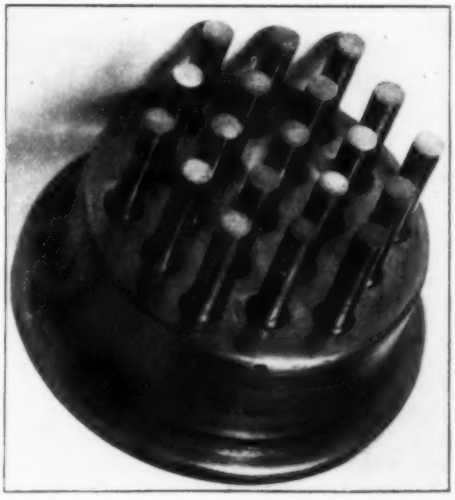


FIG. 27—Bottom punch (Fraser).

of waste and dust. To provide for these it is usually necessary to start with a larger amount of material than is required by calculation. After studying the entire question carefully and interviewing many manufacturers it is believed that a variation of 5 percent above and 5 percent below the theoretical is ample and can be readily complied with. Definite data on this point are scanty and difficult to secure. Working cards do not give them. The following are a few observations specially made by request, which represent regular runs:

Theoretical yield. *No. tablets.*	Actual yield. *No. tablets.*	Waste. *Percent.*	Gain or loss. *Percent.*
210,000	217,000	1.8	+5.10
420,000	432,000	1.3	+4.10
14,000	14,250	3.5	+5.3
29,166	28,594	1.0	—2.06

Some defects contributing to variable tablets are: (1) *Improper feeding,* due to the fact that the granulation is too fine, too coarse, too damp, or contains an excess of powder, and *excessive speed of machinery,* allowing insufficient time to uniformly fill the die or dies. (2) *Worn machinery, punches or dies.* Worn machinery may produce thick tablets one moment and thin ones the next. Worn punches and dies are the cause of "picking" (adhering to the punch), "sticking" (sticking to the die) and "whiskered" tablets, that is, tablets with elevated peripheral edges which are broken off in sifting, tending to leave ragged sides. (3) *Loosening of adjustments.* (4) *Careless weighing of the finished tablets.* The usual practice is to weigh ten tablets at intervals while a lot is being run. A common prescription balance is generally employed for the purpose. A wire gauge is also used to control the thickness of the tablets, and thus indirectly control their weight. At first it was believed that this practice was an inaccurate one, but an examination of tablets from factories where the method is in vogue showed them to be as uniform as where weighing only is practiced. It should be said, however, that where a wire gauge is used, weighing also is resorted to, but not as frequently as when weighing alone is relied upon to determine uniformity.

So far as it has been possible to determine, all tablet manufacturers and chemists believe that a total variation in weight per tablet of 10 percent, 5 percent above and 5 percent below an average, is very liberal for the larger tablets, and that if a greater variation were permitted it would encourage carelessness. That there will be some variation is conceded by all, and the variation will be greater for the smaller tablets. Manufacturers have not studied the question, at least not one of those interviewed was in a position to give any information on the point. A careful search of the literature shows that comparatively little work along this line has been done by analysts. Only one article containing data on variation in weight of individual tablets by analysts in the United States was found. Four contributions embodying information on the subject by chemists of foreign countries appear in print. The earliest was by E. J. Parry and P. A. Estcourt.[57] These investigators worked on tablets of single constituents. Their results, converted into the metric system and percentage, will be found in Table I.

[57] Pharm. J., 1894, *24:* 592-3.

TABLE I.—*Variation in the Weight of Medicinal Tablets.*

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
	Grams.	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
Ammonium chlorid, 3 grains	0.2093	0.1989	0.2054	1.9	3.1	5.0
do	.2048	.1698	.1886	8.6	10.0	18.6
do	.2048	.1912	.1963	4.3	2.5	6.8
Ammonium chlorid, 5 grains	.3953	.3408	.3784	4.5	9.9	14.4
do	.3110	.2981	.3046	2.1	2.1	4.2
Antipyrin, 5 grains	.2948	.2611	.2780	6.0	6.1	12.1
do	.4044	.3875	.3933	2.8	1.5	4.3
do	.3434	.3110	.3311	3.7	6.0	9.7
do	.3363	.2948	.3168	6.1	6.9	13.0
Quinin sulphate, 3 grains	.2274	.2158	.2203	3.2	2.0	5.2
Quinin sulphate, 2 grains	.4212	.3629	.3927	7.3	7.6	14.9
Quinin sulphate, 5 grains	.3655	.3434	.3564	2.5	3.6	6.1
Quinin sulphate, 2 grains	.2916	.2592	.2754	5.9	5.9	11.8
Saccharin, ½ grain	.0842	.0629	.0739	13.9	14.9	28.8
do	.0628	.0467	.0564	11.3	17.2	28.5
do	.0537	.0499	.0518	3.6	3.6	7.2
do	.0842	.0661	.0784	7.4	15.7	23.1
do	.0667	.0609	.0641	4.1	4.9	9.0
Sulphonal, 5 grains	.318	.305	.311	2.2	2.0	4.2
do	.382	.324	.361	5.8	10.2	16.0
do	.3466	.3259	.3357	3.3	2.9	6.2
do	.4490	.4011	.4192	7.1	4.3	11.4

The five different kinds of tablets examined show that 50 percent exceed a 10 percent total variation, 40.9 percent a 12 percent variation, and 22.72 percent a 15 percent variation. It will undoubtedly be claimed, and with justice, that these observations were made nearly a score of years ago, and every one will admit that there have been some material improvements during that time. In order that comparison may be readily made, the observations recorded by O. Liebreich, W. A. Puckner and A. H. Clark, G. Frerichs, and Eugen Seel and Albert Friederich are unified, summarized, put on a percentage basis and given in Table 2.

TABLE II.—*Variations in the Weight of Medicinal Tablets.*

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
	Grams.	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
Potassium iodid[1]	0.5116	0.4754	0.4901	4.4	3.0	7.4
Arsenious acid[1]	.0521	.0496	.0504	3.4	1.6	5.0
Copper sulphate[1]	.0560	.0490	.0516	8.5	5.0	13.5
Bismuth, opium and phenol[2]	.4053	.3400	.3833	5.7	11.3	17.0
do	.4837	.4569	.4752	1.8	3.8	5.6
do	.5747	.4993	.5328	7.9	6.3	14.2
do	.5800	.5245	.5518	5.1	4.9	10.0
do	.3951	.3742	.3852	2.6	2.8	5.4
do	.4213	.3544	.3937	7.0	10.0	17.0
do	.5221	.3690	.4457	17.1	17.2	34.3
do	.3428	.2482	.3232	6.1	23.2	29.3
do	.3646	.3417	.3525	3.4	3.1	6.5
do	.3670	.3487	.3609	1.7	3.3	5.0
Pyrenol[3]	.571	.432	.529	7.9	18.3	26.2
do[3]	.577	.483	.544	6.1	11.2	17.3
do[4]	.79	.46	.58	36.2	20.7	56.9
Pyrazolphenyldimethylsalicylate[4]	.55	.48	.53	3.8	9.4	13.2
do	.6	.6	.6	0.0	0.0	0.0
do	.55	.55	.55	0.0	0.0	0.0
Salipyrin[4]	1.18	1.05	1.12	5.4	6.2	11.6

[1]Liebreich, O., Ther. Monatshefte, 1898, *12*: 476.
[2]Puckner, W. A., and Clark, A. H., J. Am. Med. Asso., 1908, *51*: 330.
[3]Frerichs, G., Apoth. Ztg., 1908, *23*: 521, 522.
[4]Seel, Eugen and Friederich, Albert, Med. Klin., 1911, *7*: 888, 927, 928.

In 1898 when tabloids (a trade name for tablets) were introduced into the German army, O. Liebreich had the examinations recorded in Table 2 made. The results are fairly satisfactory. The examination of Puckner and Clark was mainly directed to the determination of the amount of phenol present in the tablets examined. The question of variation in weight was simply incidental. The results show that 54.54 percent exceed a 10 percent variation. The same degree of variation exists on a 12 percent basis, and 45.45 percent exceed a 15 percent variation; apparently not much of an improvement in fourteen years. Someone may say, "This phenol mixture is not suitable for making tablets, and if medical men write prescriptions for such compounds to be put up in compressed form, they ought to be prepared to get almost any kind of a variable article." Volatile substances like phenol should not be compressed into tablets. In arriving at a general conclusion as to the variability in the weight of tablets, volatile-bearing articles should not be included. They are in a class by themselves.

G. Frerichs inferred from the label "0.5 gram" on packages of "pyrenol" tablets that they contained nothing but 0.5 gram of pyrenol. In fact, there is little doubt, he believes, that every physician and apothecary labors under the same impression, particularly in view of the fact that the manufacturer made this claim. With these conditions obtaining he determined to make an examination of the tablets on the market, and incidentally weighed individually about thirty-two tablets. The results show a wide variation.

The observations made by Seel and Friederich on the variability of tablets were made in connection with a study of the causes of inferiority of some medicaments in tablet form. Their data show that tablets of acetylsalicylic acid and of pyrenol vary excessively, while tablets of two other chemicals are fairly satisfactory.

It is clearly evident that sufficient observations along this line have not been made to justify any general conclusions. The range studied must be greater in every direction. Medication in tablet form varies from a single ingredient to half a dozen or more. They contain both stable and unstable drugs, and volatile agents are also improperly put up in tablet form at times. In order to obtain extended data as to variability of weight, a large number of assorted tablets taken, first from the machines in operation, second, from trade packages as found in the market, and, third, from samples submitted by manufacturers, were weighed. The goods examined represent not only many manufacturers, both large and small, but also a liberal assortment. Twenty-five tablets were weighed in each case. The results obtained are given in Table 3.

TABLE III.—*Variations in the Weight of Medicinal Tablets.*[1]

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
1.—Compressed tablets made on single punch machine:	*Grams.*	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
Absorbent dyspeptic	0.728	0.647	0.694	4.9	6.8	11.7
Acetanilid	1.452	1.392	1.427	1.8	1.8	3.6
Acetanilid and soda comp. with quinin	.447	.420	.434	3.0	3.2	6.2
Acetanilid and quinin	.385	.330	.358	7.5	7.8	15.3
Acetphenetidin	.2065	.1765	.1874	10.2	5.8	16.0
Aloin comp. with cascara	.0708	.0619	.0654	8.2	5.4	13.6
Ammonium chlorid, 5 grains	.334	.313	.3245	2.9	3.5	6.4
do	.345	.317	.337	2.4	6.0	8.4
Antiseptic pastilles	1.080	1.054	1.068	1.1	1.3	2.4
Antiseptic, Wilson's blue	1.074	1.009	1.047	2.6	3.6	6.2
Aphrodasiac	.305	.290	.298	2.3	2.7	5.0
Aspirin	.383	.343	.363	5.5	5.5	11.0
Calomel, .1 grain	.0724	.0632	.0670	8.0	5.7	13.7
Calomel, .25 grain	.1412	.1250	.1337	5.6	6.5	12.1
Calomel and rhubarb comp	.135	.103	.126	7.1	18.2	25.3
Cascara cathartic	.0728	.0583	.0662	10.0	11.9	21.9
Celery headache	.424	.404	.415	2.2	2.6	4.8
Charcoal	.777	.710	.759	2.4	6.4	8.8
Chalk mixture	.735	.705	.727	1.1	3.0	4.1
Chlorodyne	.295	.280	.286	3.2	2.1	5.3
Cold	.280	.230	.265	5.7	13.2	18.9
Corrosive sublimate	.999	.870	.903	10.6	3.6	14.2
do	1.001	.809	.965	3.7	16.2	19.9
Cough	.158	.148	.155	1.9	4.5	6.4
Cystitis No. 2	.498	.447	.460	8.3	2.8	11.1
Digitalin	.0178	.0157	.0166	7.2	5.4	12.6
Expectorant and anodyne	.1315	.1237	.1275	3.1	3.0	6.1
Grip	.542	.512	.526	3.0	2.6	5.6
Hexamethylenamin, 5 grains	.341	.310	.331	3.0	6.3	9.3
Laxative	1.571	1.466	1.514	3.7	3.2	6.9
Migraine	.2303	.2035	.2182	5.6	6.7	12.3
Migraine improved	.430	.375	.406	5.9	7.6	13.5
Migraine No. 3	.450	.340	.387	16.3	12.2	28.5
do	.418	.352	.386	8.3	8.8	17.1
do	.398	.383	.391	1.8	2.0	3.8
Milk	1.905	1.784	1.857	2.6	3.9	6.5
Pepsin	.1684	.1486	.1588	6.0	6.4	12.4
Phenolphthalein, 2 grains	.1691	.1568	.1630	3.7	3.8	7.5
Potassium chlorate	.3403	.3230	.3331	2.1	3.0	5.1
Quinin sulphate	.1943	.1636	.1776	9.4	7.9	17.3
Quinin sulphate, 2 grains	.1712	.1546	.1636	4.6	5.5	10.1
Rheumatic No. 4	.666	.614	.646	2.1	4.9	7.0
Salol, 5 grains	.408	.392	.399	2.3	1.7	4.0
Santonin compound	.0404	.0343	.0376	7.5	8.8	16.3
Seiler	.756	.732	.744	1.6	1.6	3.2
Sodium bicarb., 5 grains	.367	.335	.357	2.8	6.1	8.9
Sodium bromid, 5 grains	.341	.317	.330	3.3	3.9	7.2
Sodium salicylate, 5 grains	.471	.448	.458	2.8	2.2	5.0
Strych. sulph., 1/60 grain	.1020	.0938	.0980	4.1	4.3	8.4
Strych. sulph., 1/30 grain	.1232	.1088	.1173	5.0	7.2	12.2
Terpine hydrate comp	.580	.500	.561	3.4	10.9	14.3
Tonic	.394	.360	.376	4.7	4.3	9.0
Worm	2.225	2.145	2.194	1.4	2.2	3.6
Zinc phenolsulphonate	.348	.327	.340	2.3	3.8	6.1
2.—Compressed tablets made on multiple punch machine:						
Acetanilid, 4 grains	.329	.282	.305	7.9	7.5	15.4
Acetanilid, 5 grains	.402	.375	.3855	4.3	2.8	7.1
do	.414	.364	.385	7.5	5.4	12.9
Acetanilid	.270	.245	.257	5.1	4.7	9.8
Acetanilid and caffein comp	.352	.311	.334	5.4	6.9	12.3
do	.958	.836	.862	11.1	3.0	14.1
Alkalin and antiseptic	1.031	.968	.996	3.5	2.8	6.3
Aloin, belladonna, strych. and ipecac	.0292	.0246	.0270	8.1	8.9	17.0
Aloin, belladonna and strychnin	.0269	.0227	.0238	13.0	4.6	17.6
Ammonium chlorid	.687	.586	.642	7.0	8.7	15.7
Ammonium salicylate and acetanilid comp.	.501	.437	.470	6.6	7.0	13.6
Antiseptic No. 1, blue	1.016	.974	.998	1.8	2.4	4.2
Antiseptic No. 1, white	.986	.926	.957	3.0	3.2	6.2
Asafoetida, 5 grains	.571	.533	.551	3.6	3.3	6.9
Bismuth sub-gallate	.432	.355	.403	7.2	12.0	19.2
Bismuth subnitrate, 2 grains	.2343	.1883	.2022	15.8	6.8	22.6
Bronchial improved	1.680	1.553	1.626	3.3	4.5	7.8
Brown mixture and ammonium chlorid	1.327	1.190	1.294	2.5	8.0	10.5
Calomel, ½ grain	.0186	.0142	.0164	13.4	13.4	26.8

[1]Weighings made by E. H. Grant, assistant chemist.

TABLE III.—(*Continued.*)

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
	Grams.	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
Calomel and sodium bicarb	.2091	.1932	.2016	3.7	4.2	7.9
Calomel and soda	.253	.231	.245	3.3	5.7	9.0
Cascara comp. No. 3	.1895	.1649	.1754	8.0	5.9	13.9
Charcoal, 10 grains	.960	.918	.936	2.6	1.9	4.5
Corrective	.0986	.0909	.0939	5.0	3.2	8.2
Corrosive sublimate, citric acid, No. 2, blue	.710	.517	.624	13.8	17.1	30.9
Creosote, chocolate coated	.389	.342	.367	6.0	6.8	12.8
Cystitis No. 2	.382	.368	.375	1.8	1.8	3.6
Dover powder, 2 grains	.148	.134	.142	4.2	5.7	9.9
Dover powder, 2.5 grains	.1006	.0921	.0963	4.5	4.3	8.8
Dover powder, 3 grains	.217	.200	.209	3.8	4.3	8.1
Hexamethylenamin	.376	.292	.328	14.6	10.9	25.5
do	.337	.309	.326	3.4	5.2	8.6
Iron and mercury comp	.0912	.0853	.0886	2.9	3.7	6.6
Lime water	.350	.300	.324	8.0	7.4	15.4
Mercury with chalk	.1450	.1346	.1400	3.6	3.8	7.4
Migraine No. 1	.288	.257	.274	5.1	6.2	11.3
Migraine No. 3, 5 grains	.404	.368	.390	3.6	5.6	9.2
do	.400	.373	.390	2.6	4.4	7.0
Phenolphthalein	.2090	.1862	.1992	4.9	6.5	11.4
Potassium iodid, 5 grains	.340	.305	.320	6.2	4.7	10.9
Quinin bisulph., 2 grains	.1792	.1649	.1722	4.1	4.2	8.3
Quinin sulph., 2 grains	.1674	.1387	.1535	9.0	9.7	18.7
Quinin sulph., 2 grains, chocolate coated	.308	.262	.283	8.8	7.4	16.2
Salol, 2.5 grains	.2245	.2090	.2159	4.0	3.2	7.2
Salol, 5 grains	.413	.348	.388	6.5	10.3	16.8
Sodium bicarb., 5 grains	.352	.309	.331	6.4	6.6	13.0
Sodium bicarb., 10 grains	.666	.624	.651	2.3	4.1	6.4
Sodium bromide, 5 grains	.333	.301	.319	4.4	5.6	10.0
Sodium bromide, 10 grains	.686	.621	.650	5.5	4.5	10.0
Sodium salicyl., 5 grains	.435	.393	.419	3.8	6.2	10.0
Stomachic sedative	.351	.311	.327	7.3	4.9	12.2
Strychnin sulphate	.0376	.0300	.0346	8.7	13.3	22.0
Triple bromids No. 1	.540	.453	.488	10.6	7.2	17.8
3.—Compressed tablets made on rotary machines:						
Acetanilid comp. No. 2	.408	.371	.390	4.6	4.9	9.5
Acetanilid and soda comp	.408	.355	.378	8.0	6.0	14.0
do	.418	.387	.403	3.7	4.0	7.7
Alkaline antiseptic, nasal	1.014	.951	.972	4.3	2.2	6.5
Antidyspeptic, No. 2	.222	.204	.214	3.7	4.7	8.4
Aspirin	.442	.315	.413	7.0	23.7	30.7
Bismuth subnitrate, 5 grains	.404	.358	.381	6.0	6.0	12.0
Blaud and strych. comp	.347	.317	.328	5.8	3.3	9.1
Bronchial	1.523	1.435	1.496	1.8	4.0	5.8
Calomel	.0267	.0241	.0252	5.9	4.4	10.3
Cascara sagrada ext., 5 grains	.337	.307	.318	6.0	3.5	9.5
do	.338	.297	.316	7.0	6.0	13.0
Charcoal	1.168	1.125	1.138	2.6	1.2	3.8
Damiana comp	.335	.281	.310	8.1	9.3	17.4
Digestive aromatic	.365	.331	.344	6.1	3.8	9.9
do	.497	.363	.423	17.5	14.2	31.7
Dyspepsia	1.228	1.137	1.165	5.4	2.4	7.8
Hexamethylenamin, 5 grains	.325	.305	.314	3.5	2.9	6.4
do	.361	.325	.338	6.8	3.8	10.6
Lactated pepsin, 5 grains	.330	.310	.321	2.8	3.4	6.2
Manganese dioxid, 2 grains	.1735	.1459	.1622	6.9	10.0	16.9
Migraine	.2725	.2503	.2579	5.7	2.9	8.6
Migraine No. 2	.264	.249	.255	3.5	2.3	5.8
Papain comp	.333	.308	.319	4.4	3.4	7.8
Phenacetin, 5 grains	.427	.384	.406	5.2	5.4	10.6
Phenacetin and caffein No. 2	.360	.343	.354	1.7	3.1	4.8
Phenolphthalein	.323	.291	.306	5.5	5.0	10.5
Quinine sulphate	.1780	.1550	.1633	9.0	5.1	14.1
Quinine sulphate, 2 grains	.1598	.1411	.1511	5.8	6.6	12.4
Salol, 5 grains	.427	.400	.413	3.4	3.1	6.5
Sedative, white, sugar coated	.581	.515	.548	5.0	6.0	12.0
Soda mint, white	.295	.272	.282	4.6	3.5	8.1
Soda mint	.350	.310	.334	4.8	7.2	12.0
Sod. salicylate, 5 grains	.504	.435	.484	4.1	10.1	14.2
do	.441	.375	.406	8.6	7.6	16.2
Strontium salicylate, 5 grains	.419	.382	.397	5.5	3.8	9.3
Sulphur and cream tartar	1.290	1.230	1.256	2.7	2.0	4.7
Terpine hydrate and heroin, No. 2	.1863	.1686	.1771	5.2	4.8	10.0
Throat, mentholated	.578	.493	.534	8.2	7.7	15.9

TABLE III.—(*Continued.*)

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
	Grams.	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
4.—Triturates and hypodermics made on single punch machines:						
Bismuth and cerium oxalate	.168	.163	.165	1.8	1.2	3.0
Calomel, .1 grain	.0514	.0458	.0486	5.7	5.7	11.4
Calomel and dover powders	.107	.094	.101	5.9	6.9	12.8
Codein	.103	.097	.099	4.0	2.0	6.0
Codein sulph., .25 grain	.1019	.0970	.0994	2.5	2.4	4.9
Hepatic	.1016	.0859	.0925	9.8	7.1	16.9
Iron, arsenic and strych.	.1404	.1310	.1365	2.9	4.0	6.9
Nux vomica ext., 5 grain	.0993	.0932	.0967	2.7	3.6	6.3
Rhubarb comp.,U.S.P. mass, .5 grain	.0852	.0783	.0815	4.5	3.9	8.4
Strych. sulph., 1/30 grain	.0956	.0895	.0924	3.4	3.1	6.5
Strych. sulph.	.1028	.0953	.0990	3.8	3.7	7.5
5.—Compressed triturates and hypodermic tablets made on multiple punch machines:						
Acid, arsenious, 1/20 grain	.0200	.0170	.0185	8.1	8.1	16.2
Aloin, belladonna, strych. and ipecac	.0695	.0569	.0636	9.3	10.5	19.8
Aloin, belladonna, strych. and ipecac, No. 1	.0957	.0801	.0893	7.2	10.3	17.5
Calomel, .1 grain	.0882	.0715	.0750	17.6	4.7	22.3
do	.0722	.0648	.0673	7.3	3.7	11.0
Cascara sagrada, powd. ext.	.0700	.0646	.0663	5.6	2.6	8.2
Morph. sulph., ¼ grain	.0892	.0780	.0828	7.7	5.8	13.5
do	.0707	.0640	.0671	5.4	4.6	10.0
Strych. sulph., 1/30 grain	.0525	.0450	.0492	6.7	8.5	15.2
6.—Triturates and hypodermic tablets made on rotary machine:						
Calomel and soda, No. 5	.2013	.1340	.1709	17.8	21.6	38.4
Cocaine hydrochlorid, ¼ grain	.0127	.0098	.0116	9.5	15.5	25.0
Corrective, infant	.1881	.1390	.1535	22.6	9.4	32.0
Morphine sulphate, ¼ grain	.0177	.0151	.0164	8.0	8.0	16.0
Morphine sulphate	.0945	.0848	.0902	4.8	5.9	10.7
Rhinitis, ½ strength	.1478	.1286	.1366	8.2	5.8	14.0
Sodium salicylate, 1 grain	.1518	.1234	.1359	11.7	9.2	20.9
Strych. sulph, 1/60 grain	.0123	.0090	.0110	11.8	18.8	30.0
do	.1005	.0868	.0950	5.6	8.6	14.2
7.—Molded tablets:						
Aconitine, 1/200 grain	.0959	.0742	.0816	17.5	9.1	26.6
Aloin and podophyllin	.0896	.0753	.0839	6.8	10.3	17.1
Antiseptic, Bernay's	.1900	.1552	.1755	8.2	11.6	19.8
Arecoline hydrobromid, ¼ grain	.1884	.1582	.1747	7.8	9.4	17.2
Arsenic iodid, 1/60 grain	.1155	.1002	.1093	5.7	8.3	14.0
Arsenious acid, ¼ grain	.1194	.1078	.1119	6.7	3.7	10.4
Barium chlorid, 5 grains	.341	.303	.326	4.6	7.0	11.6
Caffein, 1 grain	.1307	.1150	.1241	5.3	7.2	12.5
Calomel, 1/10 grain	.0740	.0657	.0703	5.2	6.5	11.7
Cardiac R. "V"	.378	.276	.332	13.9	16.9	30.8
Charcoal, 1 grain	.0749	.0695	.0716	4.6	2.9	7.5
Cocain hydrochlorid, ¼ grain	.0733	.0624	.0685	7.0	8.9	15.9
Cocain hydrochlorid, ¼ grain	.0370	.0314	.0337	9.8	6.8	16.6
Cocain hydrochlorid, ½ grain	.0299	.0270	.0290	3.1	6.9	10.0
Codein sulphate, 1 grain	.0792	.0716	.0763	3.8	6.1	9.9
Copper arsenite, 1/100 grain	.0751	.0679	.0718	4.6	5.4	10.0
Corrosive sublimate	.800	.665	.738	8.4	9.9	18.3
do	.216	.182	.200	8.0	9.0	17.0
do	.806	.722	.757	6.5	4.6	11.1
do	.186	.160	.172	8.1	7.0	15.1
do	.180	.152	.167	7.8	8.9	16.7
do	.211	.185	.198	6.6	6.6	13.2
do	1.123	1.000	1.082	3.8	7.6	11.4
do	1.050	.980	1.012	3.8	3.2	7.0
do	1.065	1.000	1.023	4.1	2.3	6.4
do	1.092	1.003	1.060	3.0	5.4	8.4
do	1.097	.996	1.059	3.6	5.9	9.5
do	.228	.200	.212	7.5	5.7	13.2
do	.928	.803	.897	3.4	10.4	13.8
do	.785	.602	.694	13.1	13.2	26.3
do	.183	.165	.178	2.8	7.3	10.1
Fever	.0597	.0531	.0558	7.0	4.8	11.8
Heart tonic, improved	.0762	.0654	.0725	5.1	9.8	14.9
Heroin, 1/20 grain	.0818	.0692	.0760	7.6	9.0	16.6
Heroin hydrochlorid, 1/24 grain	.0295	.0253	.0279	5.7	9.4	15.1
Ipecac pwd., ¼ grain	.0853	.0714	.0791	7.8	9.7	17.5
Mercuric iodid, yellow, 1/100 grain	.0773	.0688	.0725	6.6	5.1	11.7
Morphin and atropine	.0311	.0264	.0291	6.8	9.3	16.1
Morphin and atropine, No. 3	.1324	.0287	.0306	5.9	6.2	12.1
Morphin sulphate, ¼ grain	.0313	.0275	.0296	5.7	7.0	12.7

TABLE III.—(*Continued.*)

Name of tablet.	Weight of 1 tablet.			Maximum variation.		
	Maximum.	Minimum.	Average.	Above Average.	Below Average.	Total.
	Grams.	*Grams.*	*Grams.*	*Percent.*	*Percent.*	*Percent.*
Morphin sulphate, ¼ grain	.0307	.0263	.0291	5.5	9.6	15.1
do	.0690	.0597	.0648	6.5	7.9	14.4
do	.0310	.0282	.0295	5.1	4.4	9.5
do	.0287	.0222	.0245	17.1	9.4	26.5
Nitroglycerin, 1/100 grain	.0334	.0298	.0313	6.7	4.8	11.5
do	.0340	.0283	.0308	10.4	8.1	18.5
Nux vomica, 1/1000 grain	.0775	.0711	.0747	3.7	4.8	8.5
Quinin & urea hydrochlorid, 3 grains	.379	.329	.357	6.2	7.8	14.0
Quinin arsenite, 1/1000 grain	.0733	.0674	.0711	3.1	5.2	8.3
Salol, 1 grain	.0842	.0680	.0747	12.7	9.0	21.7
Sanguinarin nitrate, 1/1000 grain	.0766	.0691	.0727	5.3	5.0	10.3
Strych. phosphate, 1/30 grain	.0795	.0651	.0742	7.1	12.2	19.3
Strych. sulph., 1/150 grain	.0793	.0714	.0763	3.9	6.4	10.3
Strychnin sulphate, 1/60 grain	.0325	.0297	.0311	4.5	4.5	9.0
do	.0351	.0313	.0328	7.0	4.6	11.6
Strychnin sulphate, 1/50 grain	.0331	.0297	.0310	6.8	4.2	11.0
Strychnin sulphate, 1 grain	.0853	.0667	.0768	11.1	13.1	24.2

The following summary shows the number of kinds of tablets examined, the kind of apparatus on which they were made, and the percentage of tablets having a total (above and below average) variation of more than 10, 12, 15 and 20 per-cent, respectively:

No. of kinds.	Variety.	Kind of apparatus.	Maximum variation of more than			
			10 percent.	12 percent.	15 percent.	20 percent.
			Percent.	*Percent.*	*Percent.*	*Percent.*
54	Compressed	Single punch	44	37	19	5.6
53	do	Multiple punch	51	43	28	9.4
38	do	Rotary	45	28	15	5.3
11	T. T.[1] & H. T.[2]	Single punch	27	18	9	0.0
9	do	Multiple punch	78	67	67	11.1
9	do	Rotary	100	89	67	55.6
57	Molded	Mold	79	56	37	10.5

The number of tablets exceeding a 10 percent variation is very high. Simple tablets do not seem to fare any better than compound ones. One type of machine yields about as good results as another for the regular compressed tablets. On the whole, the single punch appears to have a little the advantage. The rotary fares badly for the compressed tablet triturates and for the hypodermic tablets. The variation in the smaller tablets is greater than in the larger, as would naturally be expected.

Of the total number of tablets, 57 percent exceed a maximum total variation of 10 percent, 44 percent a maximum of 12 percent, 28 percent a maximum of 15 percent, and 9.1 percent a maximum of 20 percent. There is little excuse for tablets exceeding a total 20 percent limit. A 10 percent variation was generally believed to be ample, but the figures do not accord with this limitation. A 12 percent variation would not relieve the situation materially, while a 15 percent variation still leaves 28 percent exceeding this limit. The large manufacturers' goods vary in weight as much as those of the small ones. It is believed that a 15 percent variation, 7½ percent above and 7½ percent below the average weight,

[1] T. T.=Tablet triturates.
[2] H. T.=Hypodermic tablets.

is very liberal and possibly excessive; yet, with this latitude, an unduly large number are found wanting. It would seem that greater care must be exercised in the manufacture of this form of medication if its time-honored claim for uniformity of weight and dosage is to be maintained.

A review of the figures in the tables shows that in a large proportion of cases the variation is about as much above as below the average. If, therefore, a number of tablets are taken for analysis, as is commonly the case, it should be found that they average the proper amount of medicament. Consequently if a patient is given a number of tablets daily he will receive the intended per diem dose. This is not ideal or scientific medication. Before accepting the conclusion even on this basis, however, let us examine the premises. It is estimated that the average tablet contains the declared amount of medication. Fortunately, the correctness of this assumption can be established by a chemical analysis in a large number of cases.

CHEMICAL ANALYSIS.

Available information on the chemical analysis of tablets is meagre. Comparatively few analyses are recorded in the literature. All chemists conversant with this industry, however, hold that a 10 percent variation above or below the amount claimed to be present is ample for the vast majority of tablets and that only in exceptional cases should this variation reach 15 percent. Tablets containing volatile agents are not considered in this general conclusion.

The earliest chemical analysis of tablets with results recorded was made by Parry and Estcourt, in 1894. Four years later O. Liebreich had some analyses made of tablets. The results obtained by these workers are shown in Table 4.

TABLE IV.—*Results of the Analyses of Tablets by Parry and Estcourt.*

Product.	Amount declared.	Amount found.	Variation.
	Grains.	*Grains.*	*Percent.*
Ammonium chlorid[3]	3.	3.08	+2.7
do	3.	2.66	—11.3
do	3.	3.03	+1.0
do	5.	5.79	+16.8
do	5.	4.70	—6.
Antipyrin	5.	4.29	—14.2
do	5.	4.86	—2.8
do	5.	4.31	—13.8
do	5.	3.80	—24.
Quinin sulphate	3.	3.06	+2.
do	2.	2.02	+1.
do	5.	4.41	—11.8
do	2.	2.06	+3.
Saccharin	.5	.66	+32.
do	.5	.54	+8.
do	.5	.51	+2.
do	.5	.61	+22.
do	.5	.44	—12.
Sulphonal	5.	4.80	—4.
do	5.	4.95	—1.
do	5.	4.74	—5.2
do	5.	5.30	+6.

[3]Parry, E. J., and Estcourt, P. A., Pharm. J., 1894, *24*: 592-3.

TABLE V.—*Results of the Analyses of Tablets by Liebreich.*[4]

Product.	Amount declared.	Amount found.	Variation.
	Grams.	*Grams.*	*Percent.*
Potassium iodid	0.5	0.4864	—2.7
do	.5	.4789	—4.2
do	.5	.4843	—3.1
do	.5	.4751	—5.0
do	.5	.5070	+1.4
do	.5	.4789	—4.2
do	.5	.5113	+2.3
do	.5	.4934	—1.3
do	.5	.4966	—0.7
do	.5	.4924	—1.5
do	.5	.4836	—3.3
do	.5	.4859	—2.8
Arsenious acid	.005	.004976	—.5
do	.005	.004917	—1.6
do	.005	.004917	—1.6
do	.005	.004976	—0.5
do	.005	.005046	+0.9
do	.005	.005174	+3.5
Copper sulphate	.05	.0560	+12.
do	.05	.0504	+0.8
do	.05	.0490	—2.0
do	.05	.0521	+4.2
do	.05	.0501	+0.2
do	.05	.0519	+3.8
Morphin hydrochlorid	.01	.00998	—0.2
do	.01	.00988	—1.2
do	.01	.00975	—2.5
do	.01	.00961	—3.9
do	.01	.00948	—5.2
do	.003	.00303	+1.0
do	.003	.00290	—3.3
do	.003	.00291	—3.0
do	.003	.00290	—3.3
do	.003	.00289	—3.7
Strychnin nitrate	.001	.00093	—7.0
do	.001	.00099	—1.0
do	.001	.00095	—5.0
do	.001	.00094	—6.0
do	.001	.00095	—5.0
Mercuric chlorid	.01	.0099	—1.0
do	.01	.0099	—1.0
do	.01	.0098	—2.0
do	.01	.0099	—1.0
do	.01	.0097	—3.0
do	.01	.0102	+2.0
do	.01	.0099	—1.0
do	.01	.0100	0.0
do	.01	.0098	—2.0
do	.01	.00996	—0.4
do	.01	.0098	—2.0

[4]Liebreich, O., Ther. Monatshefte, 1898, *12*: 476-7.

A summary on a percentage basis of these results shows the following:

	Variation greater than			
	10 Percent	12 Percent	15 Percent	20 Percent
	Percent	*Percent*	*Percent*	*Percent*
Parry and Estcourt	41.	27.	4.5	4.5
Liebreich	0.0	0.0	0.0	0.0

These results clearly indicate that the tablets examined by Parry and Estcourt vary unduly in many respects. The fact that these observations were made nearly twenty years ago should be taken into consideration. The analytical data obtained by Liebreich show that the tablets examined by him were very satisfactory. In not a single instance was there a variation of as much as 10 percent from the amount declared. This is an excellent showing, particularly in view of the fact that the tablets were made and analyzed fifteen years ago. All will concede that improvements in machinery and in manipulation, as well as along other lines, have been made since then.

TABLE VI.—*Results of the Analyses of Tablets by Pouchet.*[5]

Product.	Amount declared.	Amount found.	Variation.
	Grams.	*Grams.*	*Percent.*
Aconitine	0.00025	0.00031	+24.
Quinine hydrobromid	.030	.0292	—2.7
Sodium and caffein salicylate:			
Caffein	.0164	.014	—14.6

Although the results recorded by this observer are meager, they are included in order to make the data on this subject as complete as possible.

In 1899 J. E. Groff published an article entitled, "Examination of Tablet Triturates as Found in the Markets."[1] This worker examined tablets of calomel, mercuric iodid, morphin, and corrosive sublimate, as well as samples, of 1/60 grain strychnin sulphate. The strychnin sulphate, mercuric iodid, and corrosive sublimate tablets were found to be as represented, as were also the 1/10, 1/8, 1/4 and 1/2 grain morphin sulphate tablets. In one case doubt is expressed as to 1/8 grain morphin sulphate tablets. All of the calomel tablets contained either an excess or an insufficient amount of the drug. A careful reading of this article gives the impression that the methods used in making the determination and the form in which the results are expressed are unsatisfactory and vague.

The next systematic work was done nearly ten years later, when G. Frerichs[2] examined a number of pyrenol tablets. The results recorded by him show that the tablets he examined were, to say the least, of a very unsatisfactory character. In every instance the amount of chemical found was much less than the amount

[5]Pouchet, Gabriel, Ann. de Pharm. Louvain, 1898; *4*: 375; Abstr. Apoth. Ztg., 1899; *14*: 179.
[1]Amer. Drug., 1899, *34*: 196.
[2]Frerichs, G., Apoth. Ztg., 1908, *23*: 521-2.

declared. Nearly 88 percent exceeded a maximum 20 percent variation, as the following results will clearly show:

TABLE VII.—*Results of the Analyses of Tablets by Frerichs.*[3]

Product.	Amount declared.	Amount found.	Variation.
	Grams.	*Grams.*	*Percent.*
Pyrenol	0.5	0.319	—36.2
do	.5	.348	—30.4
do	.5	.337	—32.6
do	.5	.296	—40.8
do	.5	.308	—38.4
do	.5	.440	—12.0
do	.5	.408	—18.4
do	.5	.294	—41.2
do	.5	.322	—35.6
do	.5	.385	—23.0
do	.5	.382	—23.6
do	.5	.363	—27.4
do	.5	.223	—55.4
do	.5	.385	—23.0
do	.5	.383	—23.4
do	.5	.376	—24.8
do	.5	.308	—38.4
do	.5	.296	—40.8
do	.5	.445	—11.0
do	.5	.294	—41.2
do	.5	.348	—30.4
do	.5	.342	—31.6
do	.5	.292	—41.6
do	.5	.367	—26.6
do	.5	.327	—34.6
do	.5	.326	—34.8
do	.5	.338	—32.4
do	.5	.375	—25.0
do	.5	.314	—37.2
do	.5	.445	—11.0
do	.5	.341	—31.8
do	.5	.379	—24.2

P. Bruère, in his book published in 1908,[4] gives some data dealing with the composition of tablets, but they are not of such a character as to serve any material purpose in the present investigations.

(To be continued)

OUR FLAG.

"Its stripes of red, eternal-dyed with heartstreams of all lands;
Its white, the snow-capped hills which round our free land bands;
Its blue, the ocean-waves that beat 'round Freedom's circled shore;
Its stars, the print of angel's feet, that shine forever more."

—*Riley.*

[3] Frerichs, G., Apoth. Ztg., 1908, *23*: 521-2.

[4] Sur l'utilisation en pharmacie et en chimie analytique des comprimés de substances médicamenteuses et chimiques, Paris, 1908.

Section on Pharmacopoeias and Formularies

Papers Presented at the Sixty-First Annual Convention

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THE BEST CO-OPERATION.

It is possibly an old-fashioned and out-of-date theory, but until I learn of stronger reasons against it than any I have yet heard, I shall hold to the faith that the best co-operation, and that which will serve the drug trade as a whole, is that wherein the manufacturer, the jobber and the retailer, while co-operating within their respective classes for their own profit, shall also co-operate, honestly and heartily, with each other for the welfare of all.—*J. H. Beal.*

Section on Practical Pharmacy and Dispensing

Papers Presented at the Sixty-First Annual Convention

PHYSICIANS AND PRESCRIPTION WRITING.

R. H. NEEDHAM.

In discussing this question, I shall confine my remarks to the prescriptions found in drug stores, not those models selected from text-books. I will not consider those orders for medicines which originated years ago, were used as formulas, and since, with a little elaboration and alteration, have attained the dignity of prescriptions.

Considering a prescription as an order for drugs or medicines to be compounded and dispensed, and the order to have been written by one who understands the practice of medicine, we would have in mind an order conforming in most its details, to a model prescription. I regret that such prescriptions are the exception, though, as time goes on, the number of more uniform and perfect prescriptions shows an encouraging increase.

The errors I shall criticise are the ones most commonly made, viewed from a pharmacist's standpoint. There are many others viewed from the therapist's standpoint that justly deserve criticism, though it might not be considered within my province to present the same.

Many prescriptions are offered to the dispenser which bear no heading or name, to give the pharmacist a clew as to sex, age or for which one of the family the medicine is intended. We understand that false ethics have rather decreed that those suffering from venereal diseases should not have their ailments advertised to the world, by placing their names upon prescriptions, but I wish to state that the druggists merit just as much confidence, in this respect, as the physicians. Dispensary experience has taught me to insist upon the name and the age of the patient being given, for, if quite young or very old, we absolutely need the latter, particularly, in checking dosage.

The next point I wish to take up is the inscription. In school and in the best text-books we are taught, that a model prescription should contain,—a base, an adjuvant, a corrective and a vehicle or diluent, though a prescription *may consist* of but one ingredient. In teaching this subject to students I try to impress the importance of keeping in mind this model, and deviations from it can readily be made. We regret that so many of the prescriptions to-day, show absolutely no earmarks of the prescriber having ever been taught in such a manner. Too many prescriptions show a tendency on the part of the prescriber to "shot-gun" the disease, not by ordering twelve or more ingredients for the prescription, but to provide several drugs for emergencies which might arise during the prognosis

of the disease. The drugs prescribed frequently show a lack of knowledge as to their action in normal or pathological conditions, whether secondary or primary in their action.

As one old physician expressed it, he preferred to always shoot with a rifle and to get what he shot at, therefore he gave calomel in 4 to 10 grain doses with soda only. After all, our old doctor was not far wrong and he usually obtained results.

I submit to you an example which will illustrate another point I wish to make,—the question of solubility. A prescription is frequently written, by a number of physicians, calling for sodium bi-carbonate, sodium benzoate and benzoic acid, in aqueous solution. Sometimes hexamethylanimine replaces the sodium salt. When complaint was made of the incomplete solution of the chemicals and the explanation was offered that the sodium benzoate and the benzoic acid were not in order, retort was made that the case demanded them so they were prescribed. The prescriber might think that "shot" was required, yet complete solution could not be effected unless there was chemical re-action. Another instance brought to my attention was the prescribing of creostal with acacia and cinnamon water to make an emulsion. In whatever manner this prescription was prepared, it would turn pink upon standing, although the druggist could have avoided the color-trouble by gently warming the creostal before emulsifying, or by adding a little expressed oil of almonds. The physician refused to allow the patient to take the medicine, even after seeing it compounded. I might add that the physician was well-educated, and an instructor in the practice of medicine in a medical college. The pink color lost the druggist that physician's business, and similar color changes often make trouble owing to the ignorance of the prescriber. I would suggest that a "sticker" or small label, be placed upon such preparations as are liable to color-changes; these stating that any color-change occurring in the preparation will not alter its medical effects.

The days of "shot-gun" prescriptions are not over, as many are written which contain two or more proprietaries, these, in turn, having from three to six ingredients giving a total of ten or more drugs and some of them making most unsightly preparations.

The so-called Latin of our prescriptions cannot be called Latin, as the tendency is to abbreviate everything that can be Latinized, and when the Latin name is not at hand the English name is given. I fear this habit is due first, to a lack of knowledge of medical Latin, and secondly to indolence and carelessness. There is little or no excuse for scratching and blotting figures and signs. It has always been the belief, that if the practitioner could not read a prescription after it was "cold," that there is always one who can read it, the poor long-suffering druggist. To receive a well-written, Latinized prescription, is a source of inspiration and delight to any pharmacist, and he would be a knave indeed who would not send out the prescription with as much care and elegance as the order was written.

What are the remedies to be applied to correct some of these ills? After close observation of these particular evils, I unhesitatingly answer, *better and more thoro education both for the druggist and physician.* There is too great a difference between them in this respect, so much so that the physician with his more

complete education, looks down upon the druggist, with less education and his commercial business, as one who should not pretend to proffer advice nor be consulted on matters of prescription-writing or compounding. There are some great faults existing in our system of medical education and I shall attempt to point out one or two. In the schools to-day, prescription-reading is taught to pharmacy students, while prescription-writing is taught to "medics." The former is apt to hold to his instruction, for his mind is not diverted during his course in school. The "medic" is so extremely anxious to prescribe that he rapidly skims over the fundamentals of prescription-writing, beholding a vision of office-days, when he shall write prescriptions by the dozen. When he reaches his third and fourth year's work, he has completely forgotten the fundamentals, but has acquired a host of formulas. I regret to state that the instructors pay little attention whatever to set rules for formulating prescriptions, but write with dash and rapidity, abbreviating everything possible. There is a lack of exactness and precision, little or no attention paid to those small details which go to establish the fundamentals of prescription-writing. After all this, what opportunity has the druggist to gain the physician's confidence, that he may discuss a prescription with him, as to incompatibility, etc.?

I trust that the education of the future druggist will be so complete along this line, that he will have a more complete knowledge of pharmacology and therapeutics. Then, perhaps, it will be with all as with a physician friend, who writes or telephones his prescription *"secunden artum"* (!) for the subscription. When asked why he wrote thus, he replies that he has full confidence in his man, and believed that such a pharmacist could dispense a better prescription in every way, if given the due measure of liberty and confidence he deserved. It would appear then that if we can succeed in attracting the notice of medical instructors and direct their attention to this flaw in medical education, we would be in a position to expect better-written prescriptions. Give our pharmacists a more complete education that they may feel free to bring to the attention of practitioners the necessity of a better knowledge of the fundamentals of prescription-writing. Such a state of affairs would certainly be conducive to better and more friendly relations between druggist and doctor and we predict that the prescription-business will be increased proportionately.

DISCUSSION.

Doctor Fantus said he was sure he had profited by this paper, and voiced the same wish as the author of the paper, that more of the practicing physicians would get the advantage of proceedings of this kind. He pleaded for charity for the doctor, who wrote his prescriptions very often under the most trying circumstances—circumstances that tested the nerves of the strongest; when he had, perhaps, half a dozen crying men, women and children around him, with the patient in the most desperate condition. Under such circumstances, the physician was not likely to recall all the things that should go into a prescription, such as the writing of the patient's name, etc. He did not mean that the physician should not do these things as precisely, and with as much precaution, as the druggist should fill the prescription; he only meant to refer to the difficulties surrounding the physician at times. He, sometimes, said to his students that prescriptions should be a good deal like a bank-check, and that the same care should be exercised in writing them; in fact, that greater care should be taken. There was no question but that the highest degree of precaution should be used, in order that medicines might be administered scientifically, and be made more pleasant and efficient. He

wondered, sometimes, whether something might not be gained by making an investigation regarding the qualifications of applicants to practice medicine in prescription-writing, as an end to bettering the deplorable conditions that sometimes existed. If in order, he said he would like to move that a committee be appointed to make such investigation, and ascertain the extent to which prescription-writing was taught in the medical colleges of the country, and the extent to which medical examining-boards inquired into the thoroughness with which candidates had been prepared for prescription-writing.

This motion was seconded by Mr. Needham.

Mr. Fennell said he hoped this motion would not prevail, as he thought the pharmaceutical profession had its hands full in investigating the colleges and other teaching institutions of pharmacy of the country, and seeing that *they* did the proper thing, without invading the domain of the medical profession. He did not think it was within the province of this association of pharmacists to thus undertake an investigaton of the medical profession.

Mr. Nitardy suggested that Doctor Fantus, who had so ably put this proposition before the Association, might, as a member of the medical profession, be appointed a committee of one on this subject. It could then be made with fairly good grace, and he could report to this Section at some future time, say, next year. Then the members would be in a position to act, provided the suggestion met the approval of Doctor Fantus, after thorough consideration.

Doctor Carter said that, as a practicing physician, he desired to support the recommendation made by Doctor Fantus. No one appreciated the inability of the average physician to write the prescription properly, more than the physician himself. He had been brought in contact with both juniors and seniors in this work, and realized this as one of the greatest weaknesses of the medical profession. He had been helped more by the daily assistance of pharmacists, who filled his prescriptions, than in any other way, and he thought a great work could be done by pharmacists in training the younger physicians in this respect. This was a particularly good field for labor with young physicians beginning the practice of their profession. It would do away with the prescribing of proprietary and special formulas, which was being constantly forced upon the younger physicians. As a practitioner of medicine, he said he would be glad to support the motion made by Doctor Fantus.

Mr. Mayo said that he, too, would like to support the motion made by Doctor Fantus. A physician was not a god, nor even a demi-god; he was a mortal man. He made errors, and the pharmacist made errors. This was entirely an impersonal thing, and he thought it was wholly within the province of the pharmacists of the country to ascertain why it was that they received prescriptions which were such a discredit to the medical profession. They would be doing the medical profession a great service if they could point out these defects in their medical curriculum.

Mr. Gordon wanted to know, if this committee was appointed and made report at the next meeting, what it was proposed to do with that report. Mr. Mayo sententiously replied, "We sha'n't suppress it. The disposition of that report will lie with the body to which it is made."

Mr. Alpers said that medical schools had devoted a great deal of attention to this work of prescription-writing in late years, and he believed that the young medical men of the day were competent to write prescriptions. There were a great many physicians in the country who were deficient in this respect—who had not been taught to write prescriptions when they went to school. All pharmacists knew this, and the physicians knew it, too. It was to be regretted that it was so. He personally knew it to be a fact that physicians sometimes hesitated to write prescriptions, because they were in doubt about the proper names of things, and they would go home and fix up the prescription themselves. The desired end could only be brought about by gradual improvement in both pharmaceutical and medical colleges. If the pharmacist complained that the physician did not understand Latin, he was liable to have the physician come back and say: "How many of you understand Latin?" It was necessary for both the medical and pharmaceutical colleges to first look into the entrance requirements. The science of chemistry and other allied sciences was international, and should have a nomenclature to be understood by all nations. The only language fitted for such work was the Latin language. Every physician, therefore, should be familiar with the Latin language

before he undertook the study of medicine, and the same thing applied to the pharmacist. He could see no objection to having knowledge as to whether a medical college in New York or California taught prescription-writing, but he could see no benefit to be derived from such an investigation, beyond the securing of a lot of statistics for publication, and, personally, he did not agree with this tendency. He believed the physician and pharmacist should be, from a scientific and professional standpoint, intimate friends in every respect. He had found it better policy not to allow a continuous enmity between the two professions. A great many physicians were willing to write prescriptions and trust to the pharmacists, who had the proper education, to correct their Latin. Very often the physician did not know the exact degree of solubility of certain articles, but he said "make a solution," and left it to the pharmacist, and it would be bad taste for the pharmacist to conclude from that, that the physician was a fool.

CALOMEL SUSPENSION.*

F. W. NITARDY.

The object of this paper is not, as you may assume from the title, to explain how to produce a calomel-suspension, even though this will be done incidentally, but it is written to relate an experience which may apply to other substances precipitated from solution, and may, in that capacity, prove of interest or value.

Some years ago, a "beauty doctor" came to me with the request to duplicate for her a certain liquid face powder. I had seen the analysis of this preparation published, and I had confirmed same by my own analysis. Its composition was calomel and water.

I found that the calomel on the market was too coarse to be used for this purpose, so I determined to make a finely divided calomel by precipitating same from a dilute solution. I had no difficulty in obtaining calomel of the desired fineness or even finer, but found that when this was mixed with water, the precipitate would invariably coalesce into a curd, and then rapidly settle out. I tried to overcome this tendency in various ways but failed.

The "beauty doctor" was not satisfied with this preparation and as she left the city soon afterwards, I paid no further attention to the mixture, a sample of which still remained in our laboratory.

Some weeks later, I thought I would add some mucilage of Acacia to the mixture and see how much of a mucilaginous substance would be necessary to prevent this curding of the precipitate. So, I added 5 percent, by volume, of mucilage acacia, and shook the mixture well. I found this was sufficient to bring about the desired result, possibly more than sufficient. To determine this, I allowed the mixture to stand until the calomel had settled out, decanted a portion of the supernatant liquid and replaced it with water. It still remained in the desired condition, so I repeated the operation and kept on repeating it, until all the mucilage had been washed out of the precipitate, which no longer coalesced in curds when suspended in water. In this condition it remained suspended in the water.

To illustrate this clearly to you, I have brought a sample of the suspension, half of which has been treated as above outlined.

*Section of Practical Pharmacy and Dispensing, A. Ph. A., Nashville, Aug., 1913.

As was stated in the beginning, this paper was written to illustrate the change in the behavior of a precipitate under this treatment, for I doubt if a preparation like this calomel-suspension would have any practical value for pharmaceutical purposes, unless it be as a liquid face powder.

DISCUSSION.

Mr. Dunning said that he thought probably the explanation of the effect that Mr. Nitardy had procured was, that the mixture is somewhat of a colloidal nature, and he thought possibly he would have gotten the same results if he had used some other colloid. Gelatin perhaps might do. It might be that the bichloride might interfere in case of gelatin. However, if some suitable colloid could be found and dissolved in water in which the precipitate is to be formed, it would probably require only a trace and good results might be obtained. The calomel would be thrown out in very fine state of sub-division, and would remain in that state, and then the precipitate could be washed with a very weak solution of colloid.

Mr. Raubenheimer stated that a very surprising affect could be had by adding a small amount of gum arabic or mucilage to both of these solutions, mixing them together, and it would produce a very clear solution, with no precipitate.

Mr. Dunning's reply to this suggestion was, that it was quite possible, instead of being able to get a precipitate, one might not be gotten by following his suggestion. While a precipitate may be formed, it might have the characteristics of a solution, and this trouble, he thought, would probably be overcome by using a minute quantity of colloid, but this could only be determined by experiment.

Mr. Nitardy said that he would like to state that the fineness of precipitate in both bottles was exactly the same. This could be proven by examining the precipitates under a high-powered microscope. There was a particular tendency, which might be called molecular cohesion, which caused them to come together. After they had cohered, they settled out more readily. He recognized that there might be other ways of accomplishing these same results.

Doctor Fantus said that, just as a suggestion, he was wondering whether it might not be possible for it to be a question of electrical change, resulting in a coalescence of the particles of calomel.

Mr. Wilbert thought this was another illustration of "How little we pharmacists know." They thought they knew a lot, until they came to look into a solution or a mixture, such as those which had been seen here, and then realized it was all based upon presumption, and not upon knowledge.

Mr. Dunning said that the reason that pharmacists knew so little about conditions of this kind was, that no one knew much about colloid-solutions and colloidal-conditions, and he was positive that whatever might be the actual conditions here, it was of a colloidal-nature, or had to do with the colloids.

Mr. Windolph said the author of the paper had said that he did not know that it would matter much, since the suspension of calomel was probably useless for any other purpose, than as a liquid face-powder. He thought if there could be produced a preparation of calomel, that would hold the chemical in suspension, a valuable addition would be had to *materia medica*. The most important objection to an ointment in some of these skin lesions, was the fact that grease prevents the elimination of certain matters which should be removed; and a wash which had no greasy substance in it, and which would distribute the calomel properly, he was quite sure would find a place in many cases of eczema and such diseases.

Mr. Nitardy thanked Mr. Windolph for the suggestion made. He said that, for fear some of the members might have noticed a difference between the two bottles exhibited, aside from those he had stated, he wished to mention one thing he had forgotten, viz: In one of the preparations he had used orange-flower water, whereas in the other he had used plain water. That was done to see if the calomel would discolor in rose-water or orange-water.

A GOOD FINISH FOR PRESCRIPTION AND LABORATORY TABLE TOPS.*

F. W. NITARDY.

The prescription case or laboratory table top cannot be satisfactorily finished by the usual methods. Too many things that affect or destroy the average finish, are likely to be spilled upon them and sooner or later the top becomes unsightly. Some fixture-manufacturers furnish these tops without any finish whatever, but these offer no particular advantage as they soon become stained and no amount of scrubbing will keep them sightly.

While serving my apprenticeship in a country town in southern Minnesota, the firm invested in new fixtures and the prescription-case came with an unfinished top. My preceptor, Mr. John B. Christgau, applied a chemical which proved very satisfactory. It did not discolor nor was it in any way affected by acids, alkalies, or alcoholic liquids, etc., that might be spilled on it, and it looked as good after 10 years service as it did when first finished.

I have used this finish extensively since and found it equally satisfactory, but as I have not seen it used by others, nor its formula in print, I feel that it might bear publication, in view of its very serviceable and practical character. It may be used on new or on old finished surfaces, providing in the latter case, the wood is freed from the old finish by varnish-remover or other means.

To apply the finish proceed as follows:

Thoroughly clean the wood by scrubbing with soap and water. Allow it to dry.

Prepare a saturated solution of potassium chlorate, heat to boiling, and apply to the wood while hot, so that it will penetrate the fibre. When dry, apply a second coat, in the same manner. Now prepare a 20% solution of copper sulphate and apply boiling-hot, after the former has dried, allowing the wood to become well saturated and taking up any surplus liquid remaining after 10 to 15 minutes, so that no appreciable crystalization takes place on top of the wood.

When this is dry, apply a solution made by dissolving 90 parts by volume of aniline oil in 60 parts by volume of hydrochloric acid,diluted to 500 parts with water, and allow that to well penetrate the wood. Let this coat dry about six hours or over night, then apply a heavy coat of hot, raw, linseed oil. Allow to stand six hours or over night and scrub well with soap and water until all surplus color has been removed, that is until the water stays clean, now allow to dry and rub down well with linseed oil, applying several coats (a day or two apart) if necessary to completely fill the pores of the wood.

This gives a deep-black finish, with a slight gloss, which can be kept in perfect condition by an occasional scrubbing with soap and water and a subsequent rub-down with linseed oil.

The finish will not affect wood covered with oil, wax, varnish, or other substances, that do not permit the penetration of aqueous solutions, but will to a cer-

*Section of Practical Pharmacy and Dispensing, A. Ph. A., Nashville, Aug., 1913.

tain extent stain a light colored finish, especially white enamel, so care should be used in its application lest one might discolor adjoining woodwork.

DISCUSSION.

Mr. Raubenheimer expressed the opinion that this was a good thing, and he knew of one of the teachers in his school who used this process.

Mr. Becker called attention to the fact that a similar formula was published a few years ago by Bausch and Lomb, in the Journal of Applied Microscopy and Laboratory Methods, the title of the paper being "An Acid-Proof Table-Top," by Pierre A. Fish, New York State Veterinary College, Vol. VI, No. 3, March, 1903, pages 2211 and 2212.

Mr. Dunning said if the discussion of glass counters was in order he would like to say that in his establishment they had not had the most satisfactory experience with them. They were a most excellent medium for breaking glass things, as they had no elasticity. They had remodeled their main store, and put in solid mahogany, unvarnished counter-tops.

Mr. Wilbert suggested that if the pharmacist would take an ordinary pine board and saturate it with paraffin he would find it woud make a fine table-top.

LIQUOR MAGNESII CITRATIS.

J. LEE BROWN, PH. G.

So much has been written about Solution of Magnesium Citrate that one would think the last word had been said on the subject, yet its preparation still continues to be a source of trouble to many pharmacists. A great many formulæ and modifications of the U. S. P. process have been proposed, so I take the liberty of presenting a method that has proven entirely satisfactory in my experience for many years, and that has made "citrate" one of our best sellers. I use the U. S. P. formula with a few modifications as follows:—

Magnesium Carbonate U. S. P.	180 gm.
Citric Acid	396 gm.
Syrup	720 cc.
Spirit of Lemon	10 cc.
Potassium Bicarb.	12—2.5 gm. Tablets

Water to make 12 bottles of solution.

Place the magnesium carbonate in an aluminum vessel of about 4 L. capacity which contains about 2 L. of water. Now add the citric acid. Let stand till effervescence ceases and complete solution results. Place the vessel containing the solution, on an open flame and raise to the boiling point and allow to boil a few moments. Add the spirit of lemon and filter while hot through a well-wetted white filter, contained in an aluminum funnel. When the solution has all passed, wash the filter by passing about a pint of boiling water through it. Now add the syrup and divide the liquid accurately between twelve patent-stoppered citrate bottles. Fill the bottles nearly full with water, drop in each a 2.5 gm. tablet of potassium bicarbonate and stopper immediately. I have found it unnecessary to use distilled water, as the water in my locality is almost entirely free from any mineral contamination or organic impurities. The whole process can be completed in a short time, with very little attention. Filtering at

the boiling temperature, is completed in about ten minutes, while filtering cold, according to the U. S. P. method, requires two hours at least, and a perfectly clear and bright filtrate would not result as with my method. I have kept this solution, made as above, in the store at ordinary temperature for two weeks, perfectly clear and free from the slightest precipitation. I do not favor the proposition to use magnesium oxide, instead of the carbonate, as the oxide is so prone to change in ordinary keeping, absorbing CO_2 and changing to the carbonate. Solutions made from it would vary considerably in magnesium-content.

DISCUSSION.

Mr. Hynson exhibited a sample bottle of magnesium citrate as put up by his firm, and passed it around among the members. He said he used a green bottle for this purpose. For years, he said, he had tried to change the color of the wrapping-paper used in his store, but had never been able to do so, as he had never been able to impress upon his employes that anything but white was the proper color. A few years ago he had bought in the district around Baltimore, twelve bottles of magnesium citrate, expecting to find magnesium sulphate in them; but every one was correct as to contents, while each was bad as regarded pharmacy. Many druggists used their soda-water lemon syrup, but hardly one of the samples contained enough carbon dioxide to preserve the preparation and to make it pleasant. One of his customers had informed him upon a certain occasion that he had bought solution of magnesium citrate, and the bottles had turpentine in them—but this was several years ago.

Mr. Perry said he, at one time, had made citrate of magnesia in fairly good quantities, and always according to the process of the pharmacopœia. He had always sterilized the water and container. One day one of his men had suggested the idea of making a window exhibition, and this was done, with the result that his sales of citrate of magnesia increased 150 percent. He had several stores, and he "passed it around" to all of his stores.

In reply to a question by Mr. Nitardy as to whether he was accustomed to take the bottles back after the patient had used the contents, Mr. Hynson replied that he did not, as a rule, though this rule had an exception where he knew the party, and knew he had bought the citrate of magnesia from his store.

The Chairman stated that he had presented a paper on this subject at the Boston meeting, in 1911.

Mr. Becker said he would like to say, in connection with concentrated solution of magnesia, that he had found three times the U. S. P. strength to be a very convenient way of dispensing citrate of magnesia. He also found that it kept very well.

Before a man can reach the state of "knowing" he must train his mind to the best thought in his profession or business. The Present is always an improvement upon the Past. Unless you keep step with the present, you are certain to find yourself an incompetent laggard in the future. The men at the top "know" the exact forward movement in their chosen vocations. They can never find out enough about their work. To know and apply your knowledge is to succeed. To know that we know what we know, and that we do not know what we do not know, is true knowledge.—*The Pacific Druggist.*

Contributed and Selected

A NOTE ON THE VALUE OF PRESERVATIVES IN SYRUP OF IRON IODID.*

GEORGE M. BERINGER, PH. M.

In the U. S. P. Eighth Revision, Diluted Hypophosphorous Acid, to the extent of 20 cc. to 1000 gm., is directed to be added to this Syrup as a preservative. Several of the foreign pharmacopœias direct the use of organic acids for the same purpose; the Austrian Pharmacopœia directing 0.1 percent of Citric Acid, the Swiss Pharmacopœia, 0.05 percent of Citric Acid, and the French Pharmacopœia, 0.1 percent Tartaric Acid. The German, the British, the Danish, the Swedish, and the Italian Pharmacopœias, do not direct any preservative, dependence being placed upon the use of sufficient sugar.

In order to test the relative value of these preservatives, six samples of Syrup of Iron Iodide, were prepared on October 15, 1913. In the preparation of all of these, the official process, manipulation and percentage of iron, salt and sugar were carefully followed. These samples were preserved in my laboratory, and not exposed to direct sunlight, for several months. On December 18th, their condition was observed and noted. Subsequently, these samples were deposited with Chairman Remington and preserved in his laboratory, with the other pharmacopœial samples, until a few days ago, when I obtained them for observation of the further changes that had taken place. In the tabulation below, the appearance on these two dates of each sample is noted:

No. 1.—Prepared by the U. S. P. formula, but without preservative.

On December 18th, this sample was slightly yellow. It is now of a pale green color, and appears to be in perfect condition.

No. 2.—U. S. P. VIII, formula without any variation. On December 18th, this sample was very pale, but perfectly clear. It was noted that the green color had gradually faded and the sample was much lighter in color than when first prepared. This is in accordance with the previous observations on this formula.

This sample is now of a light yellow color and there is evidence of some change in the sugar; the change that we have commonly considered as "caramelizing," which takes place in the presence of Hypophosphorous Acid.

No. 3.—Formula of the U. S. P., with the addition of 0.05 percent of Tartaric Acid. This sample, on December 18th, had assumed a distinct yellow color. It has now faded, until it is almost colorless.

No. 4.—Formula of the U. S. P., with 0.1 percent of Tartaric Acid. On December 18th, this sample had retained a light green color, about the same

*Read at the meeting of the New Jersey Pharmaceutical Association, Lake Hopatong, June 17, 1914

tint as when first prepared. It now shows no change and appears in perfect condition.

No. 5.—Formula of the U. S. P., with the addition of 0.05 percent of Citric Acid. On December 18th, this sample was of a very light green color, and preservation appears to have been perfect. It now shows no further change.

No. 6.—Formula of the U. S. P., with the addition of 0.1 percent of Citric Acid. On December 18th, this sample had retained its original pale green color and at this time preservation appears to have been perfect.

Conclusions:—If Syrup of Iron Iodide is carefully made, with the proper amount of sugar, no preservative whatever is needed. However, to overcome the careless manipulation on the part of some druggists, it has been deemed advisable to add a preservative. Hypophosphorous Acid has the advantage of a reducing value which is not possessed by the organic acids suggested for this purpose. It has, however, the disadvantage that, in the strength directed, it will act upon sugar in strong solutions and darken the syrup. This could be overcome by substituting Glycerin for a portion of the Sugar directed in the formula.

DONT'S IN PHARMACY.*

OTTO RAUBENHEIMER, PHAR. D.

From the experience, and quite especially from the mistakes and failures, of others we can always learn. This also holds good in Pharmacy and is my excuse for this paper.

These "Don'ts in Pharmacy" are taken at random from my lectures in the Department of Pharmacy of the University of New Jersey, and have been highly appreciated by my students. No doubt some of these "Don'ts" will be helpful, even to some members of a State Pharmaceutical Association.

In the opinion of the author it is quite as essential,—equally important,—to know how *not* to do it as it is to know how to do it. Let the following maxim be the motto of every pharmacist:

"Do it well and do it right!"

In the presentation of the present paper, the author has made an attempt to classify the "Don'ts" as follows:— General, Chemicals, Galenicals, Strength of Preparations, Dispensing, and the Prescription Department.

General.—First of all, don't hide your copies of the U. S. P., N. F., Dispensatories and other standard pharmaceutical works, but keep them in a prominent place so that you can readily consult them. A druggist who cannot lay his hands on the Pharmacopœia is like a minister who cannot find his Bible.

Don't get along without a pharmaceutical library, but collect and select the standard works on pharmacy, chemistry, materia medica, pharmacognosy, etc., which serve as reference books in the daily practice of the pharmacist. As a

*Read at the meeting of the New Jersey Pharmaceutical Association in Lake Hopatcong, June, 1914.

rule, the library, or the non-existent library, of the average druggist, is a disgrace to pharmacy.

Don't fail to subscribe for, and to diligently read, at least a few pharmaceutical journals, in order to keep posted on the progress of pharmacy.

Don't neglect to become a member and an active member of your local pharmaceutical society, your state pharmaceutical association and also such national organizations as the A. Ph. A. and N. A. R. D.

Don't take an apprentice and neglect to instruct him properly in pharmaceutical *technique* and practice.

Don't forget to send this apprentice to a good college of pharmacy, where he will receive a proper education in the theory and practice of pharmacy by competent teachers.

Crude Drugs.—Don't neglect to place occasionally a little chloroform on a pledget of cotton within the containers of such vegetable and animal drugs, as are prone to be infected with insects, such as Lovage Root, Raspberries, Huckleberries, Linseed, Burdock Root, Ergot, Cantharides, etc.

Don't dispense, or utilize for galenical preparations, the following, when more than one year old: Ergot, Aspidium.

Don't neglect to separate and to reject the seeds from Coloynth, before using this drug in a preparation, because the seeds are inert and they contain fat or oil which are objectionable in pharmaceutical preparations.

Don't use the entire peel of Sweet Orange, but only the outer thin rind (the so-called "Flavedo"), which is rich in oil-cells and free from tannin or bitter principles.

Don't dispense the following drugs and preparations, except when properly aged, as directed by U. S. P. or N. F.:— Cascara (1 year), Frangula (1 year), Tincture of Ferric Chloride (3 months), Tinctura Ferri Chloridi Aetherea, N. F., (first after being decolorized and then placed in the dark to assume a golden yellow color).

Chemicals.—Don't use technical chemicals for medicinal purposes, as they do *not* comply with the U. S. P. standards and very frequently contain inert, in fact, poisonous substances.

Don't keep chemicals which readily absorb moisture in a damp place. Examples are too numerous to mention and include all hygroscopic and deliquescent chemicals. I might call attention to *one* in particular which is frequently kept in cellars and which consequently spoils, namely, Chlorinated Lime.

Don't expose certain chemicals to the action of direct lights. By such exposure Phenol and Resorcinol becomes pink or even red; Alkaloids are discolored; Iodides, especially Ammonium Iodid, liberate free Iodine; Silver Salts, Calomel and many other chemicals darken, owing to the formation of oxide; Santonin turns yellow; Naphthalene and Beta-naphthol become discolored; Sulphurous Acid is oxidized to Sulphuric Acid; Chlorine and Bromine Water form Hydrochloric or Hydrobromine Acid, respectively; Ferric Salts will be reduced to Ferrous Salts, and Mercuric Salts to Mercurous Salts; Compound Syrup of Hypophosphites become decolorized; and volatile oils become terebinthinate.

Among the other chemicals affected by light are Benzoic Acid and Benzoates,

Salicylic Acid and Salicylates, Hydriodic, Hydrobromic, Hydrocyanic, Nitrohydrochloric and Trichloracetic Acids, Amyl Nitrite and others Nitrites, Chloroform, Bromoform and Iodoform, and many others.

Don't expose *Ferric* Salts and their preparations to the light, but keep them in dark amber-colored bottles.

Don't keep *Ferrous* Salts and their preparations in the dark, but expose them to the light, for instance, Syrup of Ferrous Iodide.

Don't expose the following to the action of the air, as they readily absorb CO_2: Lead Acetate and Solution of Lead Sub-acetate; Ammonium Carbonate (forming Bi-carbonate); Calcium Oxide, Lime Water, and Magnesium Oxide, light or heavy.

Don't expose volatile chemicals, liquids or solids, as they will evaporate or lose strength.

Don't expose chemicals which effloresce to the action of dry air. In this list all crystallized salts are included.

Don't dispense the following chemical and pharmaceutical preparations, except when recently prepared: Diluted Nitro-hydrochloric Acid, Sulphurous Acid, Chlorine Water or Compound Solution of Chlorine, Creosote Water, Infusion of Digitalis, Solutions of Magnesium Citrate, of Ammonium Acetate, of Iron and Ammonium Acetate, of Potassium Citrate, of Sodium Citrate, Chalk Mixture and Compound Iron Mixture.

Don't neglect to have on hand the two (2) solutions, ready to be mixed, to form the Arsenical Antidote of the U. S. P. This should most certainly be done in every well-regulated pharmacy, as many a life might be saved, especially during the summer when poison fly paper is extensively used.

Galenicals.—Don't permit Medicated Waters to freeze, as it will destroy their aroma. This is especially true of imported Triple Orange Flower and Rose Water, which are frequently purchased in original 10 liter demijohns. It is for this reason that U. S. P. IX will include a caution notice *not* to allow Medicated waters to freeze.

Don't expose bottles of Hydrogen Peroxide to direct sunlight, as is frequently done in window-displays by druggists and other store keepers. No matter how attractive this window display may be, the H_2O_2 will gradually turn into H_2O, which can be obtained much cheaper from the hydrant or faucet.

Don't prepare Liquor Calcis by mixing together a pail of hydrant-water and a lump of ordinary mason's lime by means of a broom handle, but use the very explicit U. S. P. process, employing Calcium Oxide and Distilled Water.

Don't filter Lime Water, as filter paper will absorb, or more properly adsorb, part of the lime, and, also, because some of the calcium hydroxide will be converted into calcium carbonate by exposure to air. Lime Water should be syphoned or decanted as directed by Pharmacopœia.

Don't give away Lime Water, or any other cheap galenical preparation! Make these preparations according to U. S. P. or N. F., and charge for them!

Don't cheapen any medicines by giving them away!

Don't use Fluidextract of Belladonna *Leaves* in the preparation of Linimentum Belladonnæ, but use Fluidextract of Belladonna Root, which contains 0.4 percent

of mydriatic alkaloids, while the U. S. P. standard for Belladonna Leaves is only 0.3 percent and very likely the *unofficial* fluidextract contains the same percentage of alkaloids, if not less. I am informed by manufacturing chemists that they sell five gallons of *unofficial* Fluidextract of Belladonna *Leaves* to one pound of the official Fluidextract of Belladonna *Root*. This, very likely, accounts for the fact that a great many pharmacists in New York State had to pay a penalty for shortage in the alkaloidal-percentage of Belladonna Liniment.

Don't keep Sweet Spirit of Nitre in a quart shelf-bottle about one-quarter full, as is frequently done in ordinary drug stores, but *do* keep it, as correctly ordered by U. S. P., in small, dark, amber-colored vials in a cool place, remote from flame or fire. The author is in the habit of storing this product in four-ounce glass-stoppered amber bottles.

Don't use *gray* filter paper, as it contains impurities and frequently traces of iron. Use *white* filter paper which is a pure article, even if it costs a *few cents* extra *per 100 sheets*.

Don't use *powdered* Asafetida to make Emulsion or Milk of Asafetida, but employ *selected tears*, which are free from inert substances.

Don't forget that Elixir Iron, Quinine and Strychnine Phosphates contains the salts as *phosphates* and about 1/60 grain of Quinine Alkaloid to one fluiddram, while Elixir Iron, Quinine and Strychnine, N. F., contains the Iron as Citro-chloride, the Quinine as Hydro-chloride, and the Strychnine as Sulphate, the latter in the proportion of 1/100 grain to one fluiddram.

Don't employ *Precipitated* Chalk when *Prepared* Chalk is ordered, because the latter possesses the decided advantages of being an amorphous powder which is more adhesive.

Don't store powdered or ground white or black mustard, or mustard-plasters in a damp place, as they will rapidly lose strength.

Don't keep Compound Licorice Powder and other compound powders in the cellar, as they absorb moisture and deteriorate.

Don't dispense Cerates and Ointments when rancid, because they are very irritating.

Don't neglect to keep Syrups, Mucilages, Honeys, in fact all preparations which are liable to turn sour, in a cool place, preferably in a refrigerator.

Don't dispense Biologic Products, Ferments and other limited preparations after expiration of date, as much injury to the health of the patients may result from the use of such preparations.

Strength of Preparations.—Don't forget that, according to the Brussels Protocol, an International Agreement was signed by which all potent tinctures are 10 percent in strength, and all arsenical preparations are 1 percent in strength, and that the U. S. P. VII was the first Pharmacopœia to adopt these new standards.

Don't forget that Pearson's Solution of Sodium Arsenate, N. F., contains only one-tenth the amount of Sodium Arsenate as the U. S. P. Liquor Sodii Arsenatis.

Don't forget that, according to this International Agreement, Diluted Hydrocyanic Acid contains 2 percent of HCN, and Cherry Laurel Water 1 per mille. HCN.

Don't forget that Mercurial Ointment U. S. P. contains 50 percent metallic mercury, while Blue Ointment only contains 33 percent Hg.

Don't neglect to fill foreign prescriptions or to make preparations of foreign Pharmacopœias according to their standards, as there is quite a difference, not only in physical and chemical characteristics, but also in strength.

Dispensing.—Don't dispense *Coaltar Creosote,* when Creosote is called for, as Creosote means *Beechwood Creosote.*

Don't dispense Crocus, when Saffron is desired, to be made into an infusion against measles, but dispense Carthamus.

Don't dispense Anthemis, when Chamomile is called for, especially by a foreigner who wants Matricaria.

Don't dispense Spiritus Aetheris Compositus, when Hoffmann's *Drops* are asked for by a German customer, as he wants Spiritus Aetheris, *not* the compound.

Don't dispense Petroleum Naphtha or Benzin, when Naphtha or "Nafta" is called for by a Scandinavian who wants Spirit of Ether.

Don't dispense Petroleum Benzin, when Benzine is called for by an English customer who wants Coal-tar Benzene or Benzol C_6H_6.

Don't dispense *Boiled* Linseed Oil, in place of Oleum Lini.

Don't dispense the ordinary Turpentine for internal use, but the Rectified Oil of Turpentine.

Prescription Department.—Above all don't substitute, but dispense the articles which are prescribed and charge for same.

Don't hide your Prescription Department, but make it the most prominent feature of your store. Such signs as *"Drugs and Prescriptions in the Basement"* are a disgrace to professional pharmacy.

Don't make your motto "Cheapness and Quickness," in your Prescription Department, but much rather "Prescriptions Compounded Carefully and Conscientiously."

Don't run your Prescription Department without any or but very little apparatus and utensils, but have a complete outfit. No matter how expert the pharmacist is, he must have the necessary tools in order to turn out good work.

Don't convert metric weights and measures into the apothecaries' system; have a complete set of metric weights and measures, use these and thus avoid errors.

Don't neglect to properly number prescriptions consecutively and also to date them.

Don't forget to mark the price on each prescription in plain figures, as this will prevent unpleasant disputes with customers.

Don't file prescriptions by such an antediluvian method as a string or wire, but preserve them in a sanitary manner in a prescription book or still better, in the opinion of the author, by means of one of the up-to-date filing-cabinets.

Don't dispense ordinary water when distilled water is wanted.

Don't forget that *sterilized* water means *freshly boiled distilled water.*

Don't dispense solutions or syrups which are cloudy, but filter or strain them.

Don't forget that psychology still plays a very important part in medicine and

pharmacy. This is especially true regarding the prescriptions which you dispense.

Last, but not least, don't forget the motto: *"Cleanliness is Next to Godliness,"* and to this we might add, *"and is of the greatest importance in medicine."* It will be a credit to your Prescription Department to display such a sign.

Conclusion.—Should this little advice on "Don'ts in Pharmacy" prove helpful to the members of the New Jersey Pharmaceutical Association, then it will be followed with a continuation of them at the next meeting next year.

Meanwhile permit me to give you just one more "Don't," which in my opinion is *the* most important one, viz.:

Don't be a "Jack of all Trades," but try and be a master of a profession, namely, pharmacy.

ADVERTISING A RETAIL DRUG STORE.*

ADOLPH H. ACKERMAN, PHAR. D.

In the olden times the insignia of the alchemist, the then time pharmacist, was the glass retort or the stone mortar and the pestle. Then, when several dispensers of medicine occupied the same town, they used different signs to inform the people of their own particular drug store. These signs, were, as a rule, taken from the animal kingdom, which was, at that time, the principal source of supply for drugs for the treatment of the sick. It was the apothecary shop of "The Snake," of "The Swan," "The Lion," or "The Scorpion," etc. Within our time and particularly in Continental Europe, pharmacies are even now recognized by these signs.

In our generation the colored window show-bottle can still be seen as the sign of the apothecary.

In these days, when the profession of pharmacy is subservient to that of the commercial aspect of pharmacy, this is no longer sufficient to inform the people of the various communities of the location and capacity of a drug store, so to-day the pharmacist is compelled to use all the means and arts of the advertiser, to inform the public in regard to these facts.

The daily papers are being used by the big chain drug-stores to reach the masses. Local papers, programs, and other organs, are being utilized by the community drug-store. This class of publicity seems to be about the only method of advertising which is understood as "Advertising" amongst the retailers.

If you gentlemen, however, will recognize that Advertising is Salesmanship, and Salesmanship is Advertising, and that the object of both are "Merchandising," you will then admit that the methods I point out to-day should all be classed as advertising and should have the same earnest consideration you give any other feature of your business.

Advertising is intended not alone to tell the people in your vicinity that your

*Delivered at the Annual Convention of the Massachusetts State Pharmaceutical Association, June 17, 1914, at Swampscott, Mass.

store is located at a certain corner, but it is also meant to get your neighbors' good-will and confidence in such a manner that he will voluntarily come to your store to make his purchases in your lines.

Any action you take which induces this good-will is Advertising.

Appearance: The looks of the front of your store, such as clean, fresh paint; neat, tidy awnings; readable, dignified signs, is Advertising. Many a beautiful window is spoiled by a weather-worn frame of dingy paint or a tattered, dirty awning. Your wood-work should be painted at least four times a year with one coat of paint. This will always keep it in a clean and sightly condition, and it costs only a very small sum.

Your signs should be clean-cut and conspicuous, but still dignified and in harmony with the general color-scheme of your store.

Window-displays are really one of the most important factors of publicity and one of the least expensive methods of obtaining the interest of the passer-by. Clean windows and attractive displays should be the continual duty of the wide-awake pharmacist; and right here let me emphasize the increased selling-efficiency of the window attractively decorated, bearing price tags on every item exhibited. It is fifty percent more effective by having the prices shown.

Within the store your show cases, your floors, your soda-fountain, your prescription-counter, all, should be continually considered as means of getting the confidence, respect and good-will of your customers.

A few dollar's worth of varnish and furniture polish, applied at regular intervals, adds greatly to the neatness of your store.

Perhaps in no business is cleanliness as important as in that of the drug store. The eternal dusting, scrubbing and cleaning of your store is one of the best investments in the publicity game.

Every container leaving your store, and particularly every prescription-container, should be of unquestionable neatness and cleanliness. The prescription-bottle only partly cleansed, with the label on crooked, showing paste on the edges, with a frail cork, and untidily wrapped, is not conducive to getting the good-will nor the confidence of your customers.

If that same prescription had been put into a crystal clear, clean bottle, properly filtered if necessary, with a neatly type-written label, put on straight, the bottle capped, then wrapped in white tissue paper and neatly tied, it would have added dignity to your profession and thereby increased the confidence and respect of your customers.

The use of embossed, neat, small stickers adds elegance to the appearance of your merchandise.

The neat appearance of your clerks, and the proper decorum in which they do their duties in front or in the rear of your store, also are important factors in the attainment of your customer's good-will.

Service: In this word "service" we have the real kernel of the secret of modern merchandising, and in this age the word "service," applied to the merchant, has taken on a new and a larger meaning than that of old, when service meant servility.

Service, as applied to modern merchandising, enters into every feature of your

business. You, as the retail merchant, are therefore serving the convenience of the public, and the more convenient your store becomes to the public, the larger your rewards will be in the commercial, as well as the ethical results.

The idea which I wish to *emphasize* to you, gentlemen, is that you should become an absolute need to the community in which your store is located. Then, and then only, you can be classed among the successful druggists.

The telephone is a factor in obtaining this service-good-will. The boundaries of your store extend just as far as the farthest telephone owner who is located within convenient and profitable delivery-distance from you.

Make those of your neighbors who have telephones, get the habit of thinking your telephone number when they are in need of drug-store goods. If you accomplish this, and give them quick and cheerful service, you will surely increase your business.

The above methods we will call "Passive Advertising," to differentiate them from the constantly changing and the planning of the "Active Advertising" methods.

Throughout this country there are thousands of concerns making a specialty of planning and executing "Active Advertising" methods for the business world.

Many of these are splendid concerns, doing wonderful and profitable work for their clients, but many, through want of knowledge and experience, are costing the business world millions of dollars in luxurious and extravagant methods of publicity. And, as a whole, it is not feasible for the retail merchant to employ this class of help; first, due to the expense, and next, to the danger of putting your advertising service in hands which will merely make it a burden to you.

Now, if the retail merchant would give a thought to some of the recognized effective, but still inexpensive, methods of publicity and would understand how simple these methods are, he would surely give this part of the merchandizing-scheme more consideration than he now is doing, and thereby profit to a greater extent.

The question of a reasonable sum for the active advertising appropriation is the first one to be considered. For a retailer a sum equivalent to 2½ percent of the total business done should be a fair annual appropriation for this purpose.

Now, how should a retail druggist expend this sum in such a manner that it would show a decided profit?

Under certain conditions, the local paper undoubtedly furnishes a very satisfactory and effective method to expend a part of this sum, but in larger cities and their suburbs, the carrying of an advertisement in that city's daily paper not alone involves the expenditure of a much greater sum, but in this case the cost of the ad. covers a section from which the retailer could not hope of getting any returns, due to the distance the prospect lives from the store, so the *pro rata* cost of the circulation of this paper in your locality makes it prohibitive.

Every package leaving your store, gives you the means of distributing advertising to people who are accustomed to come to your store. Therefore, circulars, such as you get up yourself, such as are gotten up for you by the manufacturers, and yearly calendars, should be enclosed with the purchase of every customer.

This cost is not very great and should be less than 10 per cent of your total active advertising appropriation.

An occasional large flyer, covering some event in your store, like that of opening a new department, or "featuring" the soda-water fountain, or calling attention to some specialty which you wish to dispose of quickly, can be made very effective but should be carefully planned and distributed.

Here the principal expense is the cost of reliable distributors. From $2.00 to $2.50 per thousand is the usual cost for getting such advertising matter distributed in a reliable manner. An estimate of about 20 percent of your appropriation should be charged against this method of publicity.

The custom of placing your advertisements in the programs of local fairs, dances, etc., should not be charged to advertising, as it is considered to be merely money thrown away from the publicity standpoint. It is undoubtedly a judicious thing to do at times, to retain the good-will or at least to insure yourself against the ill-will of the kind of people who call on you to solicit this "Hold-up-Money."

I suggest that this should be charged to "Profit and Loss." I can see no other place for this expenditure. It is a very thinly-veiled procedure for either charity or blackmail.

There has recently come into vogue another method of publicity, which is styled "Direct Mail Advertising," and it is this method which I to-day will strongly advocate for the retail druggist. It seems to hit "the nail right on the head," and a tremendous amount of evidence can be brought forth to show that it is the most profitable of all methods of getting more business, and I strongly advise that the balance of the "Active Advertising" appropriation should be expended on this feature.

"Direct Mail Advertising" means the sending through the mail of either postcards, personal letters, pamphlets, blotters, or any other matter directed to some specific person at some specific address.

A profitable direct mail-advertising campaign depends, firstly, on the persons to whom you address this matter; secondly, on the matter itself; thirdly, on the proximity of the recipient of this to your store, either by means of personal visit, by telephone call, or by parcel-post delivery.

I will take up each point separately and in detail.

Your Mailing List: The mailing list should be carefully prepared and kept up to date, and should be divided in two sections: First, your "Present customers";—second, "Prospective customers."

The Present customer's list you can of course obtain from your ledgers, from personal information by your clerks and yourself, and by inquiry at the time of their visit, and should be used at regular intervals.

The Prospective customer's list should be carefully prepared and kept to date, and is the important part of a sound foundation of direct mail advertising, and requires constant inspection and revision.

It is evident that it would not pay you to try to reach a man who lives too far away from your store, unless he was on a direct mail-route and not more convenient to some other drug store.

The way I obtained our mailing-list was this. I took a map of the locality of our store, then I marked each street corner to which we could conveniently and inexpensively send a messenger-boy. This then, gave me our first zone of direct delivery.

I then procured a Roxbury Blue Book and the telephone book and by checking off the persons in the blue book who live within our zone of delivery, and who also were up-to-date enough and in such close touch with our store that they owned a telephone, I put on the mailing-list, and now we are reaching these families by direct mail at frequent intervals.

Club-membership lists, church-membership lists, voting-lists and rural free delivery-lists are all good means for getting your mailing-list from.

Keep your list in the form of a card-catalogue and, whenever a prospect becomes a customer, transfer her or his name to the customer's-list.

If the series runs out without a sale, transfer your card to the catalog of "Dead Ones."

Your mailing-list is one of your most valuable assets. It represents the present good-will of your business and future prosperity.

Each card should indicate the proper place of recording information, such as Full Name, Address, Send Statement To, Number in Family, Names of Other Members That Can be Used, Occupation, Advertising, Financial Rating, etc. You will thus be able to avoid sending a circular on razors and shaving material to Mrs. Brown, or some dainty toilet article to Mr. Jones, or advertising baby-requisites to a bachelor.

Salesmanship is a continuous and progressive study of human nature. Children grow up and forget their toys; men and women grow prosperous and their tastes change, but, if you can make each member of the family form the habit of thinking of your store when in need of drugs, you have made a valuable customer for years to come.

The matter which we are using at the present time, and find highly profitable, is that of personally addressed and signed type-written letters produced on the Multigraph. This splendid machine will turn out type-written letters easily and quickly, which cannot be told, apart, from personally dictated and type-written letters.

These letters I send out at frequent intervals direct to some member of each family. When I am talking candy, perfume and toilet articles, I address it to the lady of the house. When I am talking cigars or tobacco, I address the gentleman of the house.

I submit herewith copy of a letter on tooth brushes which we have used with excellent results:

Good Morning Mrs. Goodwin:

What a pleasure it is to use a good tooth brush! A well-shaped brush, one in which the bristles do not come out.

We have just secured six gross of the finest tooth brushes, manufactured by Deitsch Bros., the famous New York brush makers.

We wish to supply the discriminating families with a year's supply of these brushes, at especially low prices.

You can buy one or more of these brushes for 23c apiece, each in its own separate container.

These brushes are built to retail for 40c, others at 35c and 30c. We sell them all at one price: 23c, your own selection and assortment.

BUY A BOX OF SIX OR TWELVE.

We positively guarantee them to be the best constructed brush on the market, and will gladly risk all of our future business-relations on the quality of this brush.

In ordering just say, "Letter tooth-brush offer."

Respectfully yours,

LINUS D. DRURY CORP.

TEL. ROXBURY 48 AND GET DRURY'S INSTANT DRUG SERVICE.

These letters were printed on a high-class bond paper, correspondence size, and enclosed in similar high-grade envelopes. They were mailed at 4 o'clock in the afternoon, so that I would be sure that the lady of the house received it in the first delivery next morning, and probably would read it at the breakfast table.

You noticed that I advertised our telephone in the last line and promised them "Drury's Instant Drug Service" by merely saying "Roxbury 48" in the telephone. The result was that we received in the forenoon of the following day, nine telephone orders for tooth brushes, and all told, took forty-seven orders by telephone for this particular tooth-brush offer.

This, you must agree with me, is profitable advertising. I can cite you many other instances of similar results.

A few days before Easter, for instance, I sent out a letter about "Apollo" chocolates, and the direct result of this letter was an increase of fifty percent on our total candy business during the succeeding month.

The value of these letters did not end with the sale of the particular article we advertised, but they brought new customers, who now are buying other goods from us and will continue to do so as long as our service gives satisfaction.

How, then, brother pharmacists, can you say that you can never see direct results from advertising? It is a simple equation. A good mailing-list, pertinent advertising matter at the psychological moment, backed up by proper service gives — plus results.

This advertising by mail comes the nearest to expressing your own personality to the prospective customer in your own community, and, as one advertiser said, a well-written letter is equivalent to putting yourself in an envelope, sealing the flap, and letting "Uncle Sam" deliver you to your prospect's door.

Twenty-five dollars will reach five hundred people once a month, with this highly profitable method.

I believe that it is advisable to occasionally change the style of letters used, introducing novelties, and to enclose printed literature and I also advocate the occasional use of postal cards instead of letters.

This method should also be part of your physician's campaign. Personal letters to them describing your prescription-desk, or the especially fine galenical preparation of your own make, or the announcement to them of the stocking of some new and important product from the larger pharmaceutical houses.

Always enclose some pertinent advertising-matter with your statements.

Finally, I believe that all your "Active Advertising" should be so distinctively

YOURS that anybody should recognize it as "Your Advertising" by the merest glance, even without reading it.

Make yourself a necessity and a convenience to your neighbors; give them a "square deal" and good goods. Inform them of this every hour, with your "Passive" and "Active" Advertising, and if you do this, the department drug store need never be the "bug-a-boo" to your store, which it now threatens to become to many good pharmacists who hide their light under the bushel of obscurity.

A CRITICISM OF THE CHEMICAL TESTS FOR FRANGULA AND RHAMNUS PURSHIANA AS PROPOSED FOR THE NEW U. S. P.

E. N. GATHERCOAL, PH. G.

The introduction of chemical identity and quality tests in pharmacopœial crude-drug descriptions other than the alkaloidal assays, is a distinct advance in pharmacopœial pharmacognosy and should be encouraged.

Therefore in discussing the tests introduced into the text, descriptive of the anthraquinone drugs of the U. S. P., my object is to assist in the perfection of these tests.

The identity test for Rhamnus Purshiana, as stated in the Journal of the A. Ph. A., Vol. III, p. 398, is as follows: "Add 0.100 gm. of powdered Cascara Sagrada to 10 cc. of hot water, shake the mixture occasionally until cold, filter it and add sufficient water to make 10 cc. On the addition of 10 cc. of ammonia water to this liquid it should be colored an orange yellow."

Cascara responds very nicely to this test, though the color of the liquid after the addition of the ammonia water, is better described as a dark orange or even a light red-brown color. However, as no two people perceive a color exactly alike, I would not criticise the name of the color as stated in the text.

I would criticize however, the omission of a statement, after the test, as to from what other drugs this test is to especially distinguish Cascara. If in the application of the test, powdered Rhubarb is used, instead of powdered Cascara, the final color obtained is almost identical with that of Cascara.

The results of the above mentioned test, applied to a series of drugs, including other members of the anthraquinone group, is a matter of interest. The colors, against a white background with diffuse sunlight, of the liquid, after the addition of the ammonia, may be ranged as follows:

Cascara Class—Orange

Senna, Alexandria.
Senna, India.
Rhamnus Chlorophorus bark.
Rhamnus Californica bark.
Cascara, commercial.
Rumex.
Aloes.

Cascara, uncured, (kept but 3 months after collection).
Cascara, selected bark.
Cascara with 5% KOH solution, instead of ammonia water.
Rhubarb.

Frangula Class—Red.

Frangula, commercial.
Rhamnus Catharticus bark.
Frangula, selected bark.
Frangula, with 5% KOH solution, instead of ammonia water.
Rhamnus Crocea bark.

The solutions have been listed above in the order of their depth of color, the Alex. Senna being a decidedly light orange-yellow color; the commercial Cascara, a perceptibly deeper orange; the other three Cascaras, deeper yet, and the Rhubarb, forming the connecting link with the first Frangula. The Rhamnus Crocea bark is the darkest of all. The solutions almost form a finely graded series, from a light orange to a cherry red. All of the Cascara class are of the same color, differing only in intensity. Any one of the darker colors, suitably diluted with water, could be made to match any one of the lighter colors.

However, there is a distinction between the reds of the Frangula class and the oranges of the Cascara class, even when the red colors are diluted to the same depth of color as the orange colors.

If there should be placed, in parenthesis, after the description of the test, a statement indicating that this test is intended to distinguish Cascara from Frangula, all would be well, for the distinction in color obtained from Cascara, as compared with that from Frangula, is very pronounced: an orange from Cascara; a cherry red from Frangula.

The identity test proposed for Frangula, is similar to that proposed for Cascara, except that "a few drops" of ammonia are directed to be added, instead of 10 cc. of ammonia. I think the two tests should correspond in their wording. I found by comparing the whole series of drugs above enumerated, that the smaller amount of ammonia (0.3 cc.), answered practically as well as the larger amount (10 cc.).

The use of 1 cc. ammonia in the test for each drug would be fully satisfactory. The test should be followed with a statement that is it intended to distinguish Frangula from Cascara.

The quality test prescribed under each drug, works very satisfactorily. Used upon a number of different lots of Cascara and Frangula, the drugs in each case responded to the test, though with Cascara the final color was exceedingly faint. Here again, however, the distinction in the color obtained from Cascara and Frangula, was not as pronounced as the statement in the test would lead one to expect. In each case, the color of the ammonia, separated from the ether, is a red; more faint and more of an orange in the case of Cascara.

UNIVERSITY OF ILLINOIS SCHOOL OF PHARMACY, May, 1914

UNITED STATES PHARMACOPŒIA.

NINTH REVISION.

ABSTRACT OF PROPOSED CHANGES WITH NEW STANDARDS AND DESCRIPTIONS.

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PART IV—FIRST PROOF.

A fourth installment of the Abstract of proposed new descriptions and standards and of changes in descriptions and standards is herewith submitted.

This Abstract embraces most of the proximate assays of crude drugs and galenical preparations.

Other Abstracts will be submitted later. Comments should be sent to the Chairman of the Revision Committee, Joseph P. Remington, Longport, Atlantic County, New Jersey, before August 1, 1914.

PROXIMATE ASSAYS.

GENERAL DIRECTIONS FOR ALKALOIDAL ASSAY.

Nearly all alkaloids are practically insoluble in water, but they are more or less soluble in alcohol, chloroform, ether, amyl alcohol, benzene, petroleum benzin, or mixtures of several of these. The salts of these alkaloids, however, are mostly soluble in water, but practically insoluble in most of the above mentioned solvents. The process of assay by immiscible solvents, which is generally known as the "shaking out" process, is based on this property of alkaloids, and it is carried out by treating the drug or a concentrated liquid extract with an immiscible solvent, in the presence of an excess of alkali, which liberates the alkaloid. The free alkaloid is dissolved by the immiscible solvent, which is then transferred to a separator and shaken with an excess of acid diluted with water. If the immiscible solvent is specifically heavier than water (e. g., chloroform or a mixture of more than one volume of chloroform to one volume of ether), it will separate in the bottom of the separator. It is then drawn off into another separator and shaken with a second portion of weak acid, and this operation is repeated until the alkaloid is all removed. If the immiscible solvent is specifically lighter than water (e. g., ether, or a mixture of more than two volumes of ether with one volume of chloroform), it will, on separation, form the upper liquid. The lower acid liquid is then drawn off and preserved, and the residual immiscible solvent shaken with successive portions of weak acid until wholly free from alkaloid. The volume and strength of the acid to be used is left to the discretion of the operator. It is best, however, to keep the total volume as small as possible. For the first extraction, it is advisable to use 10 Cc. of half-normal acid V. S., or sufficient to render the mixture distinctly acid; for the second extraction, use 5 Cc. of half-normal acid V. S. and 5 Cc. of distilled water. Repeat the extraction with the same proportion of acid and distilled water. In all assays, the extraction should be

*Permission to reprint for purposes of comment can be had on application to the Chairman of the Board of Trustees, J. H. Beal, Scio, Ohio.

continued until 0.5 Cc. of the acid washings shows only a very faint cloudiness on the addition of a drop of mercuric-potassium iodide T. S., or, in the case of caffeine and colchicine, on the addition of a drop of iodine T. S. The united acid solutions containing the alkaloid in the form of a salt are shaken thoroughly with ether and allowed to stand at least fifteen minutes for complete separation. The acid solution is then drawn off into a second separator, the ether washed with a little water and this wash-water added to the acid solution. The acid solution is then made alkaline in most cases with ammonia water, and shaken out with several successive portions of the appropriate immiscible solvent. The volume of the latter to be used in each operation is not less than half that of the acid solution, and the operation must be repeated as long as any alkaloid is extracted by the immiscible solvent. To test this, evaporate 1 Cc. of the last extraction and dissolve the residue in a few drops of diluted hydrochloric acid; the resulting solution should show not more than a very faint cloudiness on the addition of a drop of mercuric-potassium iodide T. S., or, in the case of caffeine and colchicine, on the addition of a drop of iodine T. S. The number of extractions required depends largely on the character of the alkaloid. With most alkaloids it is advisable to "shake out" three or four times before testing. Physostigmine and pilocarpine require about twice as many extractions as most other alkaloids. After having drawn off from a separator any liquid containing an alkaloid, a fresh portion of the solvent should be immediately added to the contents of the separator, and, before shaking, about 1 Cc. of this should be drawn off to wash out the stem of the separator. In the case of volatile solvents, the outside of the stem of the separator should also be washed by dipping it in the portion of the fresh solvent to be used for the next shaking out operation. Before evaporation the final ether or chloroform solution should be filtered through a dry filter, or preferably through a pledget of purified cotton. When filtering volatile solvents containing alkaloids through a paper filter, the upper edge of the filter should not reach the top of the funnel and the filter should be kept constantly full of the liquid until all has been added, then covered until the last of the liquid has passed through. Finally the filter should be washed thoroughly by applying a fresh portion of the volatile solvent to the top and carefully washing the outside of the funnel stem. Immiscible solvents heavier than water may be conveniently filtered by packing the stem of the separator below the stop-cock with absorbent cotton before drawing off the solvent. The alkaloidal solution is finally evaporated cautiously to expel the solvent, and the residue either dried to constant weight and weighed, or more commonly titrated with volumetric acid. When using aliquot parts, the solvent and the aliquot part should be measured at the same temperature. When pouring volatile liquids, the lower the temperature at which the operation can be conducted, the less the danger of loss by evaporation. The shaking or rotation of immiscible solvents should ordinarily be continued about one minute. Long or violent agitation should be avoided as permanent emulsions are apt to form. Should a partial emulsion form it may be removed by drawing off the clear portion, introducing a tuft of cotton and with a glass rod moving the cotton about in the emulsion next to the surface of the separator. Should the emulsion prove persistent, draw off the emulsified portion and evaporate the volatile solvent. The resulting residue, if alkaline, should be washed with each

successive portion of the solvent used in extracting the original solution. If acid it should be washed with acidulated water.

Another method of treating emulsions is to remove the emulsified portion to another separator, and wash it with successive portions of the solvent that is being used to extract the alkaloid. Emulsions are less apt to form in strongly acid or alkaline solutions than in those which are neutral or weak. Emulsification is sometimes prevented by increasing the volume of the aqueous or immiscible solvent. Chloroform or ether solutions of drugs rich in fat form very troublesome emulsions. In such cases it is advisable to add about 10 Cc. of normal sulphuric acid V. S., and evaporate off the volatile solvent, stirring with a rubber-tipped glass rod. When the resinous and fatty matter has been agglutinated, cool the acid solution and filter it through a small wetted filter into a separator. Re-dissolve the residue in 15 Cc. of ether, add 5 Cc. of tenth-normal acid V. S., evaporate off the ether as before, with continued stirring, and pour the acid solution through the filter into the separator. Repeat the extraction of the fatty residue with dilute acid two or three times and finally wash the filter free from alkaloids. Then make the solution in the separator alkaline, and "shake out" with immiscible solvents in the usual manner. The stems of separators, funnels and the lips of flasks, separators, and graduates, from which volatile solvents containing alkaloids have been poured or drawn off, should be carefully washed to remove any of the alkaloids left by evaporation. All alkaloidal residues to be determined volumetrically should be softened by the addition of about 1 Cc. of neutral alcohol or ether, the required amount of standard acid added, and the mixture gently warmed to insure the complete solution of the alkaloid. Finally add a sufficient quantity of distilled water to make the volume of the liquid for titration measure about 25 Cc. When the residue is to be weighed, if the final solvent has been chloroform, the last traces of that solvent should be removed by the addition of a little ether or alcohol followed by evaporation, care being taken to avoid loss by decrepitation, especially when evaporating a chloroformic solution of strychnine. This may usually be prevented by the addition of a little alcohol.

Aconitum.—No change in percent. of alkaloids required; "aconitine" changed to "ether-soluble alkaloids of Aconite." *Assay* as under Belladonna Root using 15 Gm. of Aconite in No. 40 powder and ether only as the immiscible solvent throughout the assay. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 64.5 milligrammes of the ether-soluble alkaloids of Aconite.

Fluidextractum Aconiti.—The alkaloidal yield from 100 Cc. changed from "0.4 Gm. of aconitine" to "not less than 0.45 Gm. nor more than 0.55 Gm. of the ether-soluble alkaloids." *Assay.*—Drop from a pipette 15 Cc. of Fluidextract of Aconite evenly over the surface of 15 Gm. of purified sawdust (see p. 997) and evaporate to dryness at a temperature not exceeding 75° C. Then transfer the mixture to a 25 Cc. flask, and proceed as directed in the Assay of Belladonna Root, modifying the process there given by using the ammonia water with a little additional water to rinse out the dish in which the mixture was evaporated, and only ether as the immiscible solvent throughout the assay. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 64.5 milligrammes of the ether-soluble alkaloids of Aconite.

Tinctura Aconiti.—The alkaloidal yield from 100 Cc. changed from "0.045 Gm. of aconitine" to "not less than 0.045 Gm. nor more than 0.055 Gm. of the ether-soluble alkaloids." *Assay.*—Evaporate 150 Cc. of Tincture of Aconite at a temperature not exceeding 75° C., until it measures about 20 Cc. Add 10 Gm. of purified sawdust to this liquid. incorporate it thoroughly and then continue the evaporation until the sawdust is dry. Transfer the impregnated sawdust to a 250 Cc. flask, and proceed as directed in the Assay of Belladonna Root, modifying the process there given by using the ammonia water with a little additional water to rinse out the dish in which the mixture was evaporated and only ether as the immiscible solvent throughout the assay.

Extractum Aconiti Pulveratum.—It yields not less than 1.8 percent. nor more than 2.2 percent. of the ether-soluble alkaloids. *Assay.*—Introduce 3 Gm. of Powdered Extract of Aconite into a 250 Cc. flask, add 10 Gm. of washed sand and mix thoroughly. Then add 150 Cc. of ether and 2 Cc. of ammonia water, shake the mixture vigorously every 10 minutes during a half hour, and when the drugs have settled decant 100 Cc. of the clear liquid, representing 2 Gm. of the extract. Proceed as in the Assay of Belladonna Root, modifying the process there given by using only ether throughout the assay.

Belladonna Folia.—No change in alkaloidal standard. *Assay* as under Belladonna Root using 15 Gm. of Belladonna Leaves, in No. 60 powder, increasing the amount of water added after maceration to 25 Cc. and, before titration, treat the final residue twice with 5 Cc. of ether, evaporating to dryness each time.

Tinctura Belladonnæ Foliorum.—The alkaloidal yield from 100 Cc. changed from "0.03 Gm." to "not less than 0.027 Gm. nor more than 0.033 Gm. of the mydriatic alkaloids from Belladonna Leaves." *Assay.*—Evaporate 100 Cc. of Tincture of Belladonna Leaves on a water-bath until it measures about 10 Cc., transfer the evaporated liquid to a separator, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by increasing the ammonia water to 5 Cc., which, with about 5 Cc. of water, is to be used in divided portions to rinse out the dish in which the mixture was evaporated; before titrating treat the residue twice with 5 Cc. of ether, evaporating to dryness each time.

Extractum Belladonnæ Foliorum.—The alkaloidal yield changed from "1.4 percent." to "not less than 1.18 percent. nor more than 1.32 percent. of the mydriatic alkaloids of Belladonna Leaves." *Assay.*—Dissolve 2 Gm. of Extract of Belladonna Leaves in 10 Cc. of diluted alcohol, transfer the solution to a separator and wash the vessel in which the extract was dissolved with about 10 Cc. of diluted alcohol in divided portions, adding the rinsings to the separator, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by treating the residue twice with 5 Cc. of ether before titrating, evaporating to dryness each time.

Extractum Belladonnæ Foliorum Pulveratum.—It yields not less than 1.18 percent. nor more than 1.32 percent. of the mydriatic alkaloids of Belladonna Leaves. *Assay.*—Introduce 3 Gm. of Powdered Extract of Belladonna Leaves into a 250 Cc. flask, add 10 Gm. of washed sand and mix thoroughly. Then add 150 Cc. of a mixture of chloroform, 1 volume, and ether, 2 volumes, and 5 Cc. of

ammonia water. Shake the mixture vigorously every 10 minutes during a half hour and when the dregs have settled decant 100 Cc. of the clear liquid representing 2 Gm. of the extract. Proceed as directed in the Assay of Belladonna Root, modifying the process there given by treating the residue twice with ether, before titrating, evaporating to dryness each time.

Belladonnæ Radix.—No change in percent. of alkaloids. *Assay.*—Introduce 15 Gm. of Belladonna Root, in No. 60 powder, into a flask of about 300 Cc. capacity and add 150 Cc. of a mixture of chloroform, 1 volume, and ether, 2 volumes. Stopper the flask, shake it well and allow it to stand ten minutes, then add 5 Cc. of ammonia water and shake the flask vigorously every ten minutes during two hours. Now add 15 Cc. of distilled water, again shake the flask well, and, when the drug has settled, decant 100 Cc. of the solution, representing 10 Gm. of Belladonna Root. Filter the solution through a pledget of purified cotton into a separator, and rinse the graduate and cotton with a little ether. Completely extract the alkaloids from the chloroform-ether solution by shaking out repeatedly with weak sulphuric acid. Collect the acid washings in a separator, add ammonia water until the solution is decidedly alkaline to litmus, and completely extract the alkaloids by shaking out repeatedly with chloroform. Evaporate the combined chloroform washings to dryness and dissolve the alkaloids from the residue in exactly 5 Cc. of tenth-normal sulphuric acid V. S., and titrate the excess of acid with fiftieth-normal potassium hydroxide V. S., using cochineal T. S. as indicator. Each Cc. of tenth-normal sulphuric acid V. S. consumed, corresponds to 28.92 milligrammes of the mydriatic alkaloids from Belladonna Root.

Fluidextractum Belladonnæ Radicis.—The alkaloidal yield from 100 Cc. changed from "0.4 Gm." to "not less than 0.405 Gm. nor more than 0.495 Gm. of the mydriatic alkaloids from Belladonna Root." *Assay.*—Introduce 10 Cc. of Fluidextract of Belladonna Root into a separator and add 10 Cc. of water and 2 Cc. of ammonia water. Completely extract the alkaloids by shaking out repeatedly with chloroform and then extract the alkaloids from the chloroform solution by shaking out repeatedly with weak sulphuric acid until the alkaloid is completely removed. Collect the acid washings in a separator, add ammonia water until the solution is decidedly alkaline to litmus, and completely extract the alkaloid by shaking out repeatedly with chloroform. Evaporate the combined chloroform washings to dryness, dissolve the alkaloids from the residue in exactly 5 Cc. of tenth-normal sulphuric acid V. S. and then titrate the excess of acid with fiftieth-normal potassium hydroxide V. S., using cochineal T. S. as indicator. Each Cc. of tenth-normal sulphuric acid V. S. corresponds to 28.92 milligrammes of the mydriatic alkaloids from Belladonna Root.

Cantharis.—It should yield, when assayed by the process given below, not less than 0.6 percent. of cantharidin. *Assay.*—Introduce 15 Gm. of Cantharides, in No. 40 powder, into a stout bottle of not less than 250 Cc. capacity, add 150 Cc. of a mixture of benzene, two volumes, and purified petroleum benzin, one volume, and then add 2 Cc. of hydrochloric acid. Stopper the bottle tightly, shake it well, and allow it to stand over night. Now gradually warm the bottle and its contents to about 40° C. and maintain it at that temperature with fre-

quent shaking during three hours. Cool the mixture, decant or filter off 100 Cc. of clear solution and evaporate this rapidly in a tared beaker or wide-necked flask to a volume of about 5 Cc. Now add 5 Cc. of chloroform to the residue and set it aside in a moderately warm place. When the solvent has all evaporated, add to the crystals 10 Cc. of a mixture of equal volumes of absolute alcohol and purified petroleum benzin, which has previously been saturated with pure cantharidin, allow it to stand during fifteen minutes and then decant it through a pellet of purified cotton. Wash the crystals with successive portions of a saturated solution of cantharidin, similar to that directed above, until it is free from fat and coloring matter, and pass the washings through the same pellet of purified cotton. Then wash the cotton with a very small quantity of warm chloroform to dissolve any adhering crystals, collect the chloroform in the tared flask or beaker containing the washed crystals, evaporate off the solution with the aid of a blast of air, dry them at 60° C. for one-half hour and weigh. The resulting weight will be the amount of cantharidin obtained from ten grammes of Cantharides.

Cinchona.—The requirement that it "contain not less than 5 percent. of total anhydrous Cinchona alkaloids and at least 4 percent. of anhydrous ether-soluble alkaloids" changed to "not less than 6 percent. of the total alkaloids of Cinchona." *Assay.*—Introduce five grammes of Cinchona, in No. 40 powder, into a flask of 500 Cc. capacity and add 200 Cc. of a mixture of chloroform, 1 volume, and ether, 2 volumes. Stopper the flask, shake it well, and let it stand ten minutes. Then add 5 Cc. of ammonia water, shake the flask frequently for one hour, and let it stand over night. Now add 10 Cc. of distilled water, shake the mixture vigorously and when the drug has settled, decant 160 Cc. of the solution, representing four grammes of Cinchona. Filter it through a pledget of purified cotton into a separator, and rinse both cylinder and cotton with ether. Completely extract the alkaloids from the chloroform-ether solution by shaking out repeatedly with weak sulphuric acid. Collect the acid solutions in a separator, add ammonia water until the solution is distinctly alkaline to litmus, and completely extract the alkaloids by shaking out repeatedly with chloroform. Filter each portion of chloroform as it comes from the separator through a pledget of purified cotton into a tared flask, and wash the funnel and cotton with chloroform. Evaporate off the chloroform, add 5 Cc. of alcohol to the residue, and again evaporate. Repeat the evaporation with alcohol and dry the residue at 100° C. to constant weight. The weight will be the amount of total alkaloids from four grammes of Cinchona.

Fluidextractum Cinchonæ.—The alkaloidal yield from 100 Cc. changed from "4 Gm. of anhydrous ether-soluble alkaloids from Cinchona" to "not less than 4.5 Gm., nor more than 5.5 Gm. of the total alkaloids of Cinchona." *Assay.*—Drop from a pipette 5 Cc. of Fluidextract of Cinchona evenly over the surface of 10 Gm. of purified sawdust and evaporate it to dryness at a temperature not exceeding 80° C. Then transfer the mixture to a 500 Cc. flask, and proceed as directed in the Assay of Cinchona, modifying the process there given by increasing the ammonia water to 10 Cc. Use this in divided portions to rinse the dish in which the mixture was evaporated and add the rinsings to the flask.

Tinctura Cinchonæ.—The alkaloidal yield from 100 Cc. changed from "0.75 Gm. of anhydrous ether-soluble alkaloids" to "not less than 0.9 Gm. nor more than 1.1 Gm. of the total alkaloids of Cinchona." *Assay.*—Evaporate 25 Cc. of Tincture of Cinchona on a water-bath until it measures about 15 Cc., add 10 Gm. of purified sawdust, incorporate this thoroughly and then continue the evaporation at a temperature not exceeding 80° C. until it is dry. Transfer the impregnated sawdust to a 500 Cc. flask; proceed as directed in the Assay of Cinchona, modifying the process there given by increasing the ammonia water to 10 Cc. Use this in divided portions to rinse the dish in which the mixture was evaporated and add the rinsings to the flask.

Cinchona Rubra.—The requirement that it "contain not less than 5 percent. of cinchona alkaloids" changed to "not less than 6 percent.of the total alkaloids of Cinchona." *Assay* as under Cinchona, using 5 Gm. of Red Cinchona.

Tinctura Cinchonæ Composita.—One hundred cubic centimeters yields not less than 0.45 Gm. nor more than 0.55 Gm. of the total alkaloids of Cinchona. Proceed as directed in the Assay of Tinctura of Cinchona, modifying the process there given by using 50 Cc. of the Compound Tincture instead of 25 Cc. of the Tincture there directed. (Not assayed in U. S. P. VIII.)

Colchici Cormus.—No change in alkaloidal standard. Assay as under Colchicum Seed, using 15 Gm. of Colchicum Corm.

Extractum Colchici Cormi Pulveratum.—The alkaloidal yield changed from "1.4 percent." to "not less than 1.25 percent. nor more than 1.55 percent. of colchicine." *Assay.*—Proceed as directed in the Assay of Colchicum Seed, modifying the directions there given by using 6 Gm. of the Powdered Extract of Colchicum Corm instead of 15 Gm. of Colchicum Seed. The final weight will be the amount of colchicine from 2 Gm. of Powdered Extract of Colchicum Corm.

Colchici Semen.—No change in alkaloidal standard. *Assay.*—Introduce 15 Gm. of Colchicum Seed, in No. 60 powder, into a 500 Cc. flask, and add 300 Cc. of a mixture of 10 Cc. of solution of lead subacetate and 290 Cc. of distilled water. Weigh the flask and contents, and digest the mixture at from 60° to 70° C. for three hours, with occasional agitation. Cool, add distilled water to restore the original weight and filter off 200 Cc. Add 0.75 Gm. of sodium phosphate to the clear filtrate, shake the mixture frequently during half an hour, and filter off 100 Cc. representing 5 Gm. of Colchicum Seed. Shake out the alkaloid from the filtrate with chloroform until completely extracted, as shown by testing with iodine T. S. in place of the usual mercuric potassium iodide T. S., and evaporate the chloroform solution, adding about 1 Cc. of alcohol and again evaporating. Repeat this operation once more and dry the residue to constant weight at 100° C. To this weighed residue contained in a flask add 5 Cc. of approximately tenth-normal sulphuric acid V. S. and 5 Cc. of distilled water and heat the mixture for ten minutes to 70° C. Now filter the liquid through a pledget of purified cotton, and wash the flask and cotton with distilled water, rejecting the filtrate and washings and removing as much of the water from the cotton as possible. Dissolve any insoluble residue that may remain on the cotton by washing it first with a little alcohol and then with ether; collect the alcohol-

ether washings in the flask, evaporate, and dry the residue to constant weight at 100° C. Deduct this weight from the weight of residue previously obtained. The difference will be the weight of colchicine obtained from 5 Gm. of Colchicum Seed.

Fluidextractum Colchici Seminis.—The alkaloidal yield from 100 Cc. changed from "0.04 Gm." to "not less than 0.036 Gm. nor more than 0.044 Gm. of colchicine." *Assay.*—Introduce 15 Cc. of Fluidextract of Colchicum Seed into a 500 Cc. flask, add 10 Cc. of solution of lead subacetate, previously diluted with 35 Cc. of water, shake the mixture thoroughly, then add 240 Cc. of water, again agitate the mixture and proceed as directed in the assay of Colchicum Seed.

Tinctura Colchici Seminis.—The alkaloidal yield from 100 Cc. changed from "0.004 Gm." to "not less than 0.036 Gm. nor more than 0.044 Gm. of colchicine." *Assay.*—Evaporate 150 Cc. of Tincture of Colchicum Seed on a water-bath to about 20 Cc., transfer it to a 50 Cc. graduated flask and rinse the evaporating dish with about 10 Cc. of water in divided portions. Then add 10 Cc. of solution of lead subacetate, shake the mixture thoroughly, add enough distilled water to make 50 Cc. and pour this into a 500 Cc. flask. Now add 250 Cc. of recently boiled distilled water, using part of the water to rinse the 50 Cc. flask and proceed as directed in the Assay of Colchicum Seed.

Guarana.—The requirement that it "contain not less than 3.5 percent. of its alkaloidal principles," changed to "not less than 4 percent. of caffeine." *Assay.*—Introduce 6 Gm. of Guarana, in No. 60 powder, into a flask and add 120 Cc. of chloroform and 6 Cc. of ammonia water. Stopper the flask, shake it frequently for half an hour, then let it stand four hours. Again shake the flask vigorously and when the drug has settled, filter the liquid rapidly through a pledget of purified cotton and collect 100 Cc. of the filtrate, representing 5 Gm. of Guarana. Evaporate the clear filtrate to dryness and dissolve the residue in weak sulphuric acid with the aid of heat. When the liquid has cooled, filter it into a separator and wash the container and filter with several small portions of distilled water. Now add ammonia water until the liquid is distinctly alkaline to litmus and shake out the alkaloid with chloroform until completely extracted, as shown by testing with idoine T. S. in place of the usual mercuric potassium iodide T. S. Evaporate the united chloroform solutions and dry the residue to constant weight at 100° C. The weight will be the amount of alkaloid from 5 Gm. of Guarana.

Fluidextractum Guaranæ.—The alkaloidal yield from 100 Cc. changed from "3.5 Gm. of the alkaloids from Guarana" to "not less than 3.6 Gm. nor more than 4.4 Gm. of caffeine." *Assay.*—Introduce 5 Cc. of Fluidextract of Guarana into a separator, add 1 Cc. of ammonia water, and shake out the alkaloid with chloroform until completely extracted, as shown by testing with iodine T. S. Evaporate the combined chloroform solutions to dryness and dissolve the residue in 20 Cc. of distilled water with the aid of heat. Allow this to cool, filter it into a separator and wash the container and filter with several small portions of distilled water, adding the rinsings to the liquid in the separator. Then shake out the alkaloid with chloroform until completely extracted, as shown by testing with iodine T. S., evaporate the combined chloroform solutions and dry the

residue at 100° C. to constant weight. The weight will represent the alkaloid in 5 Cc. of Fluidextract of Guarana.

Hydrastis.—No change in percent. of alkaloids required, "hydrastine" changed to "ether-soluble alkaloids of Hydrastis." *Assay* as under Belladonna Root, using 10 Gm. of Hydrastis, in No. 60 powder, and 100 Cc. of ether and taking 50 Cc. of the ether-solution, representing 5 Gm. of Hydrastis. Use only ether as the immiscible solvent throughout the assay and dry the residue to constant weight at 100° C. The weight will be the amount of ether-soluble alkaloids from 5 Gm. of Hydrastis.

Fluidextractum Hydrastis.—The alkaloidal yield from 100 Cc. changed from "2 Gm. of hydrastine" to "not less than 1.8 Gm. nor more than 2.2 Gm. of the ether-soluble alkaloids of Hydrastis." *Assay.*—Proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by using 5 Cc. of Fluidextract of Hydrastis instead of 10 Cc. of the Fluidextract of Belladonna Root. Use only ether as the immiscible solvent throughout the assay and dry the residue at 100° C. to constant weight, instead of titrating it. The weight will represent the amount of ether-soluble alkaloids in 5 Cc. of the Fluidextract of Hydrastis.

Glyceritum Hydrastis.—100 Cc. yields not less than 1.12 Gm. nor more than 1.37 Gm. of the ether-soluble alkaloids of Hydrastis. (Not assayed in U. S. P. VIII.) Proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by using 5 Cc. of the Glycerite of Hydrastis instead of 10 Cc. of the Fluidextract of Belladonna Root. Use only ether as the immiscible solvent throughout the assay. Wash the final ether extractions with 10 Cc. of water, draw off the water and discard it. Then filter the ether solution through a pledget of purified cotton, wash the cotton with ether, evaporate the filtrate and washings, and dry the residue at 100° C. to constant weight instead of titrating it. The weight will represent the amount of ether-soluble alkaloids in 5 Cc. of the Glycerite of Hydrastis.

Tinctura Hydrastis.—The alkaloidal yield from 100 Cc. changed from "0.4 Gm. of hydrastine" to "not less than 0.36 Gm. nor more than 0.44 Gm. of the ether-soluble alkaloids of Hydrastis." *Assay.*—Evaporate 50 Cc. of Tincture of Hydrastis on a water-bath until it measures about 10 Cc., transfer the evaporated liquid to a separator, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by using the ammonia water with about 5 Cc. of water, in divided portions, to rinse out the dish in which the mixture was evaporated. Use only ether as the immiscible solvent throughout the assay and dry the residue at 100° C. to constant weight, instead of titrating it. The weight will represent the amount of ether-soluble alkaloids in 50 Cc. of Tincture of Hydrastis.

Extractum Hydrastis Pulveratum.—It yields not less than 9.0 percent. nor more than 11.0 percent. of the ether-soluble alkaloids of Hydrastis. *Assay.*—Introduce 3 Gm. of Powdered Extract of Hydrastis into a 250 Cc. flask, add 10 Gm. of washed sand and mix thoroughly. Then add 150 Cc. of ether and 5 Cc. of ammonia water. Shake the mixture vigorously every 10 minutes during a half hour and when the dregs have settled decant 100 Cc. of the clear liquid,

representing 2 Gm. of the extract. Proceed as directed in the Assay of Belladonna Root, modifying the process there given by using only ether throughout the assay, and drying the residue to constant weight at 100° C. The weight will be the amount of ether-soluble alkaloids from 2 Gm. of Powdered Extract of Hydrastis.

Hyoscyamus.—The percent. of mydriatic alkaloids required, changed from "0.08" to "0.06." *Assay* as under Belladonna Root, using 30 Gm. of Hyoscyamus, in No. 60 powder, and 300 Cc. of the chloroform-ether mixture. Increase the amount of distilled water, added after maceration, to 40 Cc. and take 200 Cc. of the chloroform-ether solution, representing 20 Gm. of Hyoscyamus. Before titration treat the final residue twice with 5 Cc. of ether, evaporating to dryness each time.

Fluidextractum Hyoscyami.—The alkaloidal yield from 100 Cc. changed from "0.075 Gm." to "not less than 0.055 Gm. nor more than 0.075 Gm. of the mydriatic alkaloids of Hyoscyamus." Proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by using 25 Cc. of the Fluidextract of Hyoscyamus in place of 10 Cc. of Fluidextract of Belladonna Root; before titrating treat the residue twice with 5 Cc. of ether, evaporating to dryness each time.

Tinctura Hyoscyami.—The alkaloidal yield from 100 Cc. changed from "0.007 Gm." to "not less than 0.0055 Gm. and not more than 0.0075 Gm. of the mydriatic alkaloids of Hyoscyamus." *Assay.*—Evaporate 250 Cc. of Tincture of Hyoscyamus on a water-bath to about 10 Cc., transfer the evaporated liquid to a separator, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by increasing the ammonia water to 5 Cc., which, with 5 Cc. of water is to be used, in divided portions, to rinse the dish in which the Tincture was evaporated, before titrating treat the residue twice with 5 Cc. of ether, evaporating to dryness each time.

Extractum Hyoscyami.—The alkaloidal yield changed from "0.3 percent." to "not less than 0.215 percent. nor more than 0.288 percent. of the mydriatic alkaloids of Hyoscyamus." *Assay.*—Proceed as directed in the Assay of Belladonna Leaves, modifying the process there given by taking 5 Gm. of Extract of Hyoscyamus instead of 2 Gm. of Extract of Belladonna Leaves.

Ipecacuanha.—The percent. of Ipecac alkaloids required changed from "1.75" to "2." *Assay* as under Belladonna Root, using 10 Gm. of Ipecac, in No. 80 powder, and 100 Cc. of ether. Take 50 Cc. of the ether solution, representing 5 Gm. of Ipecac. Use ether only as the immiscible solvent throughout and dissolve the residue in 10 Cc. of tenth-normal sulphuric acid V. S. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 24.0 milligrammes of Ipecac alkaloids.

Fluidextractum Ipecacuanhæ.—The alkaloidal yield from 100 Cc. changed from "1.5 Gm. of the alkaloids of Ipecac" to "not less than 1.8 Gm. nor more than 2.2 Gm. of the ether-soluble alkaloids of Ipecac." Drop from a pipette 10 Cc. of Fluidextract of Ipecac evenly over the surface of 10 Gm. of purified sawdust, and evaporate it to dryness at a temperature not exceeding 80° C. Then trans-

fer the impregnated sawdust to a 250 Cc. flask, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by increasing the ammonia water to 5 Cc. Use this with about 5 Cc. of water, in divided portions, to rinse the dish in which the mixture was evaporated, and add the rinsings to the flask. Now add 100 Cc. of ether, and take 50 Cc. of the ether solution, representing 5 Cc. of Fluidextract of Ipecac. Use only ether as the immiscible solvent and dissolve the residue in 10 Cc. of tenth-normal sulphuric acid V. S. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 24 milligrammes of the ether-soluble alkaloids of Ipecac.

Jalapa.—No change in total resin standard. The further requirement that "not more than 15 percent. of the total resin should be soluble in ether" is omitted. *Assay.*—Pack 10 Gm. of Jalap, in No. 60 powder, in a cylindrical percolator and extract it with alcohol until 100 Cc. of percolate is obtained. Transfer 20 Cc. of the percolate to a separator, add 20 Cc. of chloroform, mix the liquids, then add 20 Cc. of distilled water and shake the mixture thoroughly. When the liquids have completely separated, draw off the chloroform into a tared beaker, wash the contents of the separator with 5 Cc. of chloroform without shaking and draw it off into the beaker. Evaporate the chloroform solution on a water-bath, add about 2 Cc. of alcohol, again evaporate, then dry the residue to constant weight at 100° C. The weight will be the amount of total resin from 2 Gm. of Jalap.

Nux Vomica.—The requirement that it "contain not less than 1.25 percent. of strychnine" changed to "not less than 2.5 percent. of the total alkaloids of Nux Vomica." *Assay* as under Belladonna Root using 15 Gm. of Nux Vomica in No. 40 powder, and increasing the quantity of ammonia water from 5 to 10 Cc. and the time of maceration to 12 hours; also, for titration, dissolve the alkaloid in the residue in 10 Cc. of tenth-normal sulphuric acid V. S. instead of 5 Cc. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 36.4 milligrammes of the total alkaloids of Nux Vomica.

Fluidextractum Nucis Vomicæ.—The alkaloidal yield from 100 Cc. changed from "1 Gm. of strychnine" to "not less than 2.37 Gm. nor more than 2.63 Gm. of the total alkaloids of Nux Vomica." Proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by dissolving the alkaloidal residue in 10 Cc. of tenth-normal sulphuric acid V. S. instead of 5 Cc. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 36.4 milligrammes of the total alkaloids of Nux Vomica.

Tinctura Nucis Vomicæ.—The alkaloidal yield from 100 Cc. changed from "0.1 Gm. of strychnine" to "not less than 0.237 Gm. nor more than 0.263 Gm. of the total alkaloids of Nux Vomica." Evaporate 100 Cc. of Tincture of Nux Vomica on a water-bath until it measures about 10 Cc., transfer the evaporated liquid to a separator, and proceed as directed in the Assay of Fluidextract of Belladonna Root, modifying the process there given by using 5 Cc. of ammonia water with a little water, in divided portions, to rinse the dish in which the Tincture was evaporated and by dissolving the residue in 10 Cc. of tenth-normal sulphuric acid V. S. instead of 5 Cc.

Extractum Nucis Vomicæ Pulveratum.—The alkaloidal yield changed from "5 percent. of strychnine" to "not less than 15.2 percent. nor more than 16.8 percent. of the total alkaloids of Nux Vomica." Introduce 3 Gm. of Powdered Extract of Nux Vomica into a 250 Cc. flask, add 10 Gm. of washed sand and mix thoroughly. Then add 150 Cc. of a mixture of ether, 2 volumes, and chloroform, 1 volume, and 5 Cc. of ammonia water. Shake the mixture vigorously every 10 minutes during half an hour and when the dregs have settled decant 100 Cc. of the clear liquid, representing 2 Gm. of the extract. Proceed as directed in the Assay of Belladonna Root, modifying the process there given by dissolving the alkaloidal residue in 10 Cc. of tenth-normal sulphuric acid V. S. instead of 5 Cc.

Physostigma.—No change in alkaloidal standard. *Assay.*—Introduce 15 Gm. of Physostigma in No. 60 powder, into a flask of about 300 Cc. capacity, and add 150 Cc. of ether. Stopper the flask, shake it well and allow it to stand ten minutes, then add 10 Cc. of an aqueous solution of sodium bicarbonate (1 in 20) and shake the mixture vigorously at intervals during four hours. Now add 15 Cc. of distilled water, again shake the flask well, and when the drug has settled, decant 100 Cc. of the solution, representing 10 Gm. of Physostigma. Filter the solution through a pledget of purified cotton into a beaker and rinse the graduate and cotton with ether. Add 20 Cc. of tenth-normal sulphuric acid V. S. and evaporate off the ether, stirring during the evaporation with a rubber-tipped glass rod. After the resinous and fatty matter has agglutinated, pour off the acid solution through a wetted filter into a separator. Redissolve the residue in the beaker in about 15 Cc. of ether, add 2 Cc. of tenth-normal sulphuric acid V. S., evaporate off the ether with continued stirring as before and pour the acid solution on the filter. Repeat this operation until all of the alkaloid is extracted and then wash the filter with distilled water until it is free from alkaloids. Collect the solution and washings in a separator, add sufficient sodium bicarbonate to make the solution decidedly alkaline to litmus and completely extract the alkaloids by shaking it out repeatedly with ether. Wash the combined ether with 10 Cc. of distilled water and filter the ether solution, washing the container and filter with ether. Evaporate the combined ether solutions to dryness, dissolve the alkaloids from the residue in exactly 5 Cc. of tenth-normal sulphuric acid V. S. and titrate the excess of acid with fiftieth-normal potassium hydroxide V. S., using cochineal T. S. as indicator. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 27.52 milligrammes of the alkaloids of Physostigma.

Tinctura Physostigmatis.—The alkaloidal yield from 100 Cc. changed from "0.014 Gm. of the ether-soluble alkaloids from Physostigma" to "not less than 0.013 Gm. nor more than 0.017 Gm. of the alkaloids of Physostigma." Evaporate 150 Cc. of Tincture of Physostigma on a water-bath until it measures about 20 Cc., add 10 Gm. of purified sawdust to the liquid and incorporate it thoroughly. Continue the evaporation on a water-bath, until the mixture is dry, then transfer the impregnated sawdust to a 250 Cc. flask, and proceed as directed in the Assay of Physostigma, modifying the process there given by using the solution of sodium bicarbonate, in divided portions, to rinse the evaporating dish.

Extractum Physostigmatis.—The alkaloidal yield changed from "2 percent. of ether-soluble alkaloids" to "not less than 1.7 percent. nor more than 2.3 percent. of the alkaloids of Physostigma." Dissolve 2 Gm. of Extract of Physostigma in 10 Cc. of diluted alcohol, drop the solution evenly over the surface of 15 Gm. of purified sawdust, and rinse the vessel with 5 Cc. of diluted alcohol in divided portions, adding the rinsings to the sawdust. Evaporate the mixture to dryness on a water-bath, transfer it to a 250 Cc. flask, and proceed as directed in the Assay of Physostigma, modifying the process there given by using the solution of sodium bicarbonate in divided portions, to rinse the evaporating dish.

Pilocarpus.—Percent. of Pilocarpus alkaloids changed from "0.5" to "0.6 percent." *Assay* as under Belladonna Root using 15 Gm. of Pilocarpus, in No. 60 powder, and decreasing the amount of water to be added after maceration to 5 Cc. Each Cc. of tenth-normal sulphuric acid V. S. corresponds to 20.8 milligrammes of the alkaloids of Pilocarpus.

Fluidextractum Pilocarpi.—The alkaloidal yield from 100 Cc. changed from "0.4" to "not less than 0.55 Gm. nor more than 0.65 Gm. of the alkaloids from Pilocarpus." Drop from a pipette 15 Cc. of Fluidextract of Pilocarpus evenly over the surface of 15 Gm. of purified sawdust, and evaporate it to dryness on a water-bath. Then transfer the mixture to a 250 Cc. flask, and proceed as directed in the Assay of Belladonna Root, modifying the process there given by increasing the ammonia water to 5 Cc., which, with 5 Cc. of water is to be used, in divided portions, to rinse the dish in which the Fluidextract was evaporated. Each Cc. of tenth-normal sulphuric acid V. S. corresponds to 20.8 milligrammes of the alkaloids of Pilocarpus.

Stramonium.—No change in alkaloidal standard. *Assay* as under Belladonna Root, using 15 Gm. of Stramonium, in No. 50 powder, increase the amount of water to be added after maceration to 25 Cc., and, before titration, treat the final residue twice with 5 Cc. of ether, evaporating to dryness each time. Each Cc. of tenth-normal sulphuric acid V. S. consumed corresponds to 28.92 milligrammes of mydriatic alkaloids.

Tinctura Stramonii.—The alkaloidal yield from 100 Cc. changed from "0.025 Gm." to "not less than 0.0225 Gm. nor more than 0.0275 Gm. of the mydriatic alkaloids from Stramonium." Evaporate 100 Cc. of Tincture of Stramonium on a water-bath until it measures about 10 Cc., transfer the evaporated liquid to a separator, and proceed as directed in the assay of Fluidextract of Belladonna Root, modifying the process there given by using the ammonia water and about 5 Cc. of water in addition to rinse the dish in which the Tincture was evaporated, and treat the residue twice with 5 Cc. of ether, before titrating, evaporating to dryness each time.

Extractum Stramonii.—The alkaloidal yield changed from "1.0 percent." to "not less than 0.9 percent. nor more than 1.1 percent. of the mydriatic alkaloids of Stramonium." Proceed as directed under the Assay of Extract of Belladonna Leaves, using 2 Gm. of Extract of Stramonium.

Extractum Stramonii Pulveratum.—It yields not less than 0.9 percent. nor more than 1.1 percent. of the mydriatic alkaloids of Stramonium. Proceed as

directed under the Assay of Powdered Extract of Belladonna Leaves, using 3 Gm. of Powdered Extract of Stramonium.

Purified Sawdust.—(Insert among Reagents.) Moisten 1000 Gm. of Oak Sawdust, in No. 20 Powder, with water, pack in a cylindrical percolator and pour on enough of a 1 percent. sodium hydroxide solution to saturate the powder and leave a layer above it. When the liquid drops from the percolator, close the lower orifice and macerate the sawdust during 24 hours. Then proceed to percolate slowly until 5000 Cc. of the sodium hydroxide solution has been added, continue the percolation with 4000 Cc. of 1 percent. hydrochloric acid and then wash the sawdust with water until the acid is all removed, the percolate being neutral. Finally dry the powder.

TOTAL EXTRACTIVE AS A FACTOR IN FLUIDEXTRACT MANUFACTURE.

E. L. MAINES, PH. C., PHAR. D., AND R. J. GARDNER, PH. G.

The determination of total extractive is an important factor in the manufacture of fluidextracts, especially those of the non-alkaloidal drugs.

This principle is carried out in part by the assay methods for the oleoresinous drugs, such as Aspidium, Cubebs, Capsicum and Ginger, and the resinous drugs, such as Podophyllum and Jalap. In these assays, however, the oleoresin and resin, respectively, are estimated, whereas, in the total extractive determination, all substances soluble in the percolating menstruum are determined combined.

The complete exhaustion of a drug is made more positive by total extractive estimations, provided of course, the proper menstruum is employed. It also gives an index to the possible yield in the manufacture of solid or powdered extracts.

Several conditions tend to regulate the amount of solids in a fluidextract, such as, nature of drugs, fineness of powder and menstruum employed. Such drugs as Cincona and Ipecac give varying amounts of extractive matter and indeed, in some instances, it is almost impossible to completely extract even their active principles.

In the alkaloidal drugs, however, the estimation of extractive matter is of little or no importance.

Drugs that are extremely difficult to exhaust are fortunately in the minority and in most cases complete extraction is readily accomplished and the total extractive yield fairly constant.

The manner of making total solid (extractive) determinations is so well known that it is not necessary to comment upon it in this article. A table of total extractive determinations is given below which represents estimations covering many years of work and the products of several of the largest manufacturers.

TABLE SHOWING TOTAL EXTRACTIVE OF FLUID EXTRACTS.

Fluid Extracts	Percent Extractive
Aletris	9-12
Aloes, Fluid, for Tinct	28-30
Ambrosia	12-19

Fluid Extracts	Percent Extractive
Angelica Root	8-10
Arbor Vitæ	8-10
Arnica Flowers	14-16
" Root	9-11
Asafetida, Fluid for Tinct	14-17
Asarum	12-15
Asclepias	10-12
Avena Sativa	5-10
Balsam Poplar Buds	30-35
Bayberry Bark	12-15
Baptisia	12-15
Benzoin, Fluid for Tinct	45
" Comp. Fluid for Tinct	35-40
Berberis	8-10
Blackberry, Aromatic	28-30
Black Willow	12-13
Blue Cohosh	18-22
Bryonia	4-5
Buchu	16-20
" Comp.	15-18
Buckthorn Bark	18-20
" Berries	30-35
Calamus	8-12
Calumba	4-5
Cantharides	12-15
Caraway Seed	12-17
Cardamom Seed	2½-3
Cascara Amarga (Snakewood Bark)	12-14
Cascarilla	6-8
Cassia Cinnamon	6-9
Catechu	30-32
Caulophyllum	18-22
Celery Seed	4-5
Cereus Grandiflorus, Green Drug	1-2
Chamomile	22-25
Chimaphila	25-28
Chionanthus	25-30
Cimicifuga	8-10
Cloves	14-15
Cocculus Indicus	10-12
Collinsonia	12-15
Colocynth	16-18
Coltsfoot	10-12
Condurango	10-12
Convallaria	20-24
Corn Silk	5-6
Corydalis	10-20
Cubebs	10-12
Cypripedium	14-17
Dogwood	25
Echinacea	10-12
Elecampane	19-22
Eucalyptus	22-25
Euonymus	12-14
Euphorbia	14-16
Galega	13-16
Gambir Comp., Fluid for Tinct	30-35
Garlic	9-10
Gelsemium	14-16
Gentian	25-30
" Comp., Fluid for Tinct. and Infusion	24-30
Geranium	30-35
Glycyrrhiza	16-18
Gossypium	16-30
Gravel Plant	12-17
Grindelia	12-15
Guaiac Resin, Fluid for Tinct	58-60
Guarana	22-26

Fluid Extracts	Percent Extractive
Hamamelis Leaves	22-30
Horse-Nettle Berries	8-10
" " Root	8-10
Hops	26-30
Hydrangea	8-10
Ignatia	14-16
Inula	16-20
Iris	11-13
Jaborandi	13-14
Jambul Seed	11-16
Juglans	20-24
Juniper Berries	30-32
Kava Kava	4-6
Krameria	22-25
Lactucarium	15-20
Lappa	25-28
Larkspur Seed	15-20
Leptandra	20-25
Life Root	12-14
Lobelia	15-17
" Comp.	12-15
Logwood	6-8
Lupulin	35-38
Male Fern	5-6
Manaca	5-6
Myristica	10-14
Myrrh	22-25
Orange Peel, Bitter	14-16
Pareira	18-20
Parsley Seed	7-9
Passion Flower	16-17
Phytolacca Fruit	36-39
" Root	17-20
Pichi	15-18
Pomegranate	15-17
Pulsatilla	7-9
Quassia	2-4
Queen of the Meadow	7-9
Red Gum	24-26
Rhubarb	25
" Aromatic	26-30
Rhus Aromatica	12-20
" Glabra	24-25
" Toxicodendron	12-20
Rose	30-34
Rosin Weed	10-12
Rue	16-20
Rumex	20-22
Salix Nigra	12-13
Sambucus	18-22
Sandalwood	5-10
Sarsaparilla	10-12
" Comp., for Syrup	20-25
Sassafras Bark	20-23
Savin	5-7
Saw Palmetto	4-5
Scoparius	9-11
Scutellaria	18-20
Senega	25-28
Senna	14-16
Serpentaria	9-11
Skullcap	12-15
Soaptree Bark	30-35
Spigelia	16-20
" and Senna, for Syrup	16-20
Spikenard	12-14
Squaw Vine	16-18
" " Comp.	15-18

Squill, 1890	25-30
" Comp., for Syrup	26-30
" U. S. P.	25-30
" Alcoholic	25-30
Staphisagria	11-14
Stillingia	6-8
Sumbul	20-24
Sundew	14-15
Symphytum	12-15
Taraxacum	20-25
Tolu (for Tinct.)	40-42
Trifolium	14-17
Triticum	29-32
Turnera	14-16
Uva Ursi	50-60
Valerian	10-15
Viburnum Opulus	15-18
" Prunifolium	14-16
Water Pepper	6-8
White Pine Bark	17-20
Wild Cherry Bark	30-35
Xanthoxylum Berries	5-7
Yerba Santa	19-25

Remarks:—The term "Fluid" is applied to those preparations which do not represent the U. S. P. standard of strength.

MANUFACTURING LABORATORIES, BRISTOL-MYERS COMPANY, June 5, 1914.

..PREPARATION AND ANALYSES OF VLEMINCK'S SOLUTION.*

JOSEPH L. MAYER.

A short time ago two samples of Vleminck's Solution were submitted to me with a request that, in view of the fact that the color of one sample was markedly different from the other, analyses be made to ascertain if they were properly prepared.

Since the National Formulary, only, contains a formula for the preparation, and various pharmaceutical authorities consulted, made no reference to a standard, it was necessary to make samples, to determine how the solution should be prepared and what should be the strength of the finished product. The following work was therefore undertaken.

Referring to page 81, 3rd edition of the National Formulary we found that "Liquor Calcis Sulphuratæ"—"Vleminck's Solution"—was directed to be prepared as follows:

Lime, freshly slaked	165 grammes
Sublimed Sulphur	250 grammes
Water, a sufficient quantity to make	1000 grammes

Mix the slaked lime with the sulphur, and add the mixture gradually to 1750 cc. of boiling water. Then boil the whole, under constant stirring, until it is reduced to 1000 grammes, strain, and having allowed the solution to become clear by standing in a well-stoppered bottle, decant the clear brown liquid, and keep it in completely filled and well-stoppered bottles."

*Read before the Kings County Pharmaceutical Society, May 12, 1914.

We, accordingly, made up one-tenth of this formula, by taring a 600 cc. porcelain evaporating dish, adding 175 cc. of water, heating to boiling, and then slowly adding the mixture of freshly slaked lime and sulphur, constantly stirring while heating, until the weight was reduced to 100 grammes. The material was then decanted into a 4 oz. cork-stoppered bottle, allowed to stand until the next day, filtered and assayed for total sulphur by the following method:

"Measure 10 cc. of the clear sample in a 100 cc. measuring flask and fill to the mark. Analyze 10 cc. aliquots of this solution. Treat with 3 cc. of saturated solution potassium hydroxide or sodium hydroxide solution, following by 50 cc. hydrogen peroxide free from sulphates. Heat on the steam bath for one-half hour exactly, and then acidify with hydrochloric acid, precipitate with barium chloride,—in the usual way, in boiling solution,—and finally weigh as barium sulphate."

Multiplying the weight of barium sulphate by the proper factor gives the quantity of sulphur and this, multiplied by 100, gives the percentage.

Blanks were run on the reagents, and these determined the quantity of sulphate present, which was then deducted from that found in the actual analysis.

This is Avery's method, and it is suggested by the Association of official agricultural chemists for the analysis of lime—sulphur-dips and lime-sulphur-salt mixture (U. S. Dep't Agr. Bureau of Chemistry, Bul. 107 rev. page 34). It is an extremely accurate and simple test which in our hands yielded remarkably close results.

We also analyzed the sample for total sulphur in solution, mono-sulphur equivalent, thiosulphate sulphur, sulphate and sulphite sulphur, total sulphide-sulphur and total lime (CaO) in solution, following the method in the Bulletin of the Bureau of Chemistry, U. S. Department of Agriculture, No. 162, page 29, but seeing no advantage over the Avery method, we employed that in all our analyses and simply determined the total sulphur of which the above sample showed the presence of 10.838 grammes in 100 cc. of solution.

Another 100 gramme lot made up in the same manner contained 14.581 grammes of total sulphur in 100 cc. of solution.

This great variation in results, indicated difficulty in properly preparing the solution. We therefore referred to the directions in the N. F. and found it directed to add the lime and sulphur mixture "gradually to 1750 cc. of boiling water. Then boil the whole under constant stirring until it is reduced to 1000 grammes"; this procedure differs from mine in that it directs the water to be heated to boiling, the mixture of lime and sulphur added and the whole boiled under constant stirring until the weight is reduced to 1000 grammes.

Another 100 gramme lot was then made by strictly adhering to these directions and when assayed showed the presence of 4.448 grammes of total sulphur in 100 cc. solution.

My original reading of the process was, as above noted, to heat the water to boiling and then, while the water was still on the fire, to gradually add the lime and sulphur under constant stirring, and boiling until the proper weight was produced, whereas the last product was made by strictly following the N. F. by heating the water to boiling, taking it off the fire, stirring the lime and sulphur

in, putting it back on fire, stirring and heating until the proper weight was attained.

The above figures clearly indicated that the wording of the manipulation in the N. F. was faulty; therefore another batch of 100 grammes, employing the official quantities, was made by taring a 250 cc. Erlenmeyer flask, adding 175 cc. of water, heating on the hot plate until boiling, and then adding the lime and sulphur previously mixed and boiling on the hot plate, without stirring or further attention, until the weight was reduced to 100 grammes, transferred to a 4 oz. cork-stoppered bottle, allowed to stand until the next day, filtered and assayed.

The solution contained 29.162 grammes of total sulphur in 100 cc.

Another lot made by the same method contained 29.593 grammes of total sulphur in 100 cc. solution.

These figures indicate that, if the solution is prepared in a flask, the product will practically be of uniform strength.

It is true the N. F. does not state whether a flask or evaporating dish should be employed. The result of the failure to specifically state, that a flask or similar vessel be used, is shown, by the analyses, to yield preparations of indefinite strength. If a large flask is not at hand, vessels which are deep should be employed, the object being to avoid too rapid evaporation of water, as the proper preparation of the product requires several hours.

In view of the above results the Committee on National Formulary should revise the wording of the directions for the preparation of Vleminck's solution, and thus insure a uniform product. If thought necessary a standard could be fixed for the preparation, and a method of assay appended.

I would take this opportunity to acknowledge my indebtedness to my assistant, J. H. Wiener, Ph. C., for assistance rendered in the preparation and analyses of some of the samples.

THE ASSAY OF MAGMA MAGNESIAE.*

CHARLES H. LA WALL, PH. M.

Magma Magnesiæ is a form of medicinal whitewash employed as an antacid, consisting of a suspension of magnesium hydroxide in water. Its use has been popularized by a well-known proprietary preparation, and as every pharmaceutical manufacturer and many retail pharmacists are at present making their own product, the necessity for standardization for the production of uniformity becomes apparent, and the Committee on Scope of the Ninth Revision of the U. S. P., have wisely concluded to admit the preparation to the official list under the above title.

The proposed formula provides for a preparation containing about 5 percent of magnesium hydroxide in suspension in water, all appreciable amounts of other compounds being removed in the process of washing which the precipitate undergoes. From the standpoint of the pharmacist the simplest method of assay would

*Presented to the meeting of the New Jersey State Pharmaceutical Association, June, 1914.

be by evaporation to dryness, or evaporation and subsequent ignition, but experimentation has shown that the former method is inaccurate, on account of the varying states of hydration which the product assumes as it dries, and the latter method is no more accurate and is just as tedious as the more logical method of determining the alkalinity of the preparation by residual titration and then calculating the results to magnesium hydroxide. The following method was found to give very satisfactory results:—

Take, approximately, 3 gm. of the magma, in a tared 100 cc. beaker or dish. Weigh accurately and dissolve in 25 cc. of half-normal hydrochloric acid. Titrate the excess of acid with normal potassium hydroxide V. S., using phenolphthalein as indicator. The factor for magnesium hydroxide, with half-normal hydrochloric acid, is 0.0148.

An examination of twelve specimens by the foregoing method, showed the following results:—

No.	Origin of Sample	Percent of magnesium hydroxide
	Theoretical amount present	5.28
1.	Experimental lot made by student	9.57
2.	Experimental lot made by student	8.58
3.	Experimental lot made by student	3.11
4.	Made by a retail pharmacist	4.44
5.	Made by a Philadelphia manufacturer A	7.25
6.	Made by a Philadelphia manufacturer B	6.36
7.	Made by a Philadelphia manufacturer C	2.81
8.	Made by a Philadelphia manufacturer C	3.11
9.	Made in a hospital dispensary	2.22
10.	Made by a Brooklyn manufacturer	4.44
11.	Proprietary preparation	7.54
12.	Proprietary preparation	7.25

The foregoing results indicate the great need for standardization, in a product of which the variation, as shown in commercial samples, is such that there is a difference of over 300 percent between the strongest and the weakest.

If the present official process is adopted, it would seem advisable to establish a range, say from 4.5 to 5.5, which should be the extreme tolerance of variation in a product of this kind.

Sail on, O Ship of State!
Sail on, O Union, strong and great!
Humanity with all its fears
With all the hopes of future years,
Is hanging breathless on thy fate!

—*Longfellow.*

COLLOIDS AND THEIR IMPORTANCE TO PHARMACY.*

CURT P. WIMMER, PHAR. D., NEW YORK.

If I remember correctly, it was about five or six years ago that my esteemed friend, Jerome Alexander, in conjunction with Professor Hallock of Columbia University, exhibited and explained the ultra-microscope for the first time at a meeting of the College of Pharmacy. A few months after that, at a meeting of the Chemist's Club, I had again occasion to view a number of substances in the ultra-microscope and, each time and ever since, have been greatly interested in the colloid state of matter and have made it my business to follow the rapid strides which this new science, called "Colloid-Chemistry," has made. The first sight of a substance in the colloidal state under the ultra-miscroscope is a truly impressive and remarkable one: the substance, which appears to be perfectly homogeneous and at rest when observed with the naked eye, is found to be full of life and motion. We see little particles oscillating back and forth; we see the everlasting, never-ending motion of matter. Again, a few weeks ago, I attended a series of colloid-chemical conferences held by Dr. Wolfgang Ostwald at Columbia University, and I felt that Colloid Chemistry is, and will be destined to be of the greatest importance to all sciences, but especially to pharmacy.

It is with a great deal of pleasure that I come before you to-night with the privilege of talking about colloids and their importance to pharmacy.

In the short space of an hour allotted to me, it will be possible only to skip over the surface of the science and to give the most important facts, omitting much that would be of great interest.

I have divided the subject matter of my lecture into two general parts:

1. The nature, preparation and properties of colloids.
2. Their importance to the sciences, especially to that of pharmacy.

The subject of colloids is a vast one, although the science, as such, is only about fifteen years old, and is growing at a pace which makes it well nigh impossible to keep track of it. Colloids have been prepared and used for centuries, but without any true conception of this state of matter.

Although true colloidal solutions have been prepared as far back as 1802 by Richter, in 1839 by Woehler, and again in the fifties by Faraday, Kuhn and St. Gilles, none of these investigators had an exact idea of the true state of colloidal sub-division, although some of them suspected that they had metals suspended in the liquid in fine subdivision. The first systematic investigations along these lines were made by Thos. Graham, an English scientist, in 1861 to 1864, who published his findings in "Philosophical Transactions," and in "Liebig's Annalen der Chemie." Graham studied dialysis—the diffusion of dissolved substances through parchment paper or a membrane. He observed that some substances passed readily into a surrounding pure solvent, while others did not or, at least, did so at an exceedingly slow rate.

*A lecture delivered before the New York Branch of the American Pharmaceutical Association, March 9, 1914.

Those which passed through, he found to be substances which could be readily obtained in crystalline form, those which did not pass through were usually amorphous or glue-like, so he divided all matter into two general classes: Crystalloids and Colloids (from colla, glue).

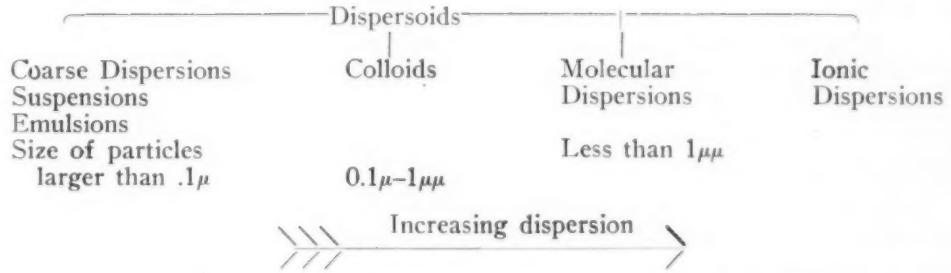
But Graham made another important discovery. He found that certain substances, which were said to be insoluble, could be obtained in so-called pseudo-solutions, (a term proposed by Franceschi di Selmi in the forties). Graham prepared solutions of Ferric Hydroxide, Chromium Hydroxide and others, and found that they did not dialyse, so he gave them the name "Colloidal Solutions," or "Sols," a term which is now accepted and used for a colloidal solution. It would lead too far to go into all of Graham's investigations; simply let me state that they laid the foundation for the colloid chemistry of to-day. After Graham, work on colloidal substances was done by others, but little importance was attached to it; the theoretical and practical researches of organic and inorganic chemistries dominated the scientific world. Whatever chemical change or phenomenon which could not be expressed by a formula was not considered worth investigation. Interest in the subject was re-awakened, however, in the late nineties, when Bredig succeeded in preparing colloidal solutions of heavy metals by the aid of the electric spark.

The actual impetus to the work on colloids, however, was given by the invention of the Ultra-Microscope by Zigmondy and Siedentopf in 1905.

Our present view of the nature of colloids is diametrically opposed to that of Graham. He distinguished two worlds,—the Crystalline and the Colloid worlds. Our present accepted view is, that there is only one world and that the colloid state can be assumed by any substance, solid or liquid, under appropriate conditions.

A general definition for a colloidal solution or a "sol" is this: A colloid is any solid, liquid or gaseous substance in a certain state of subdivision, or dispersion, in another solid, liquid or gaseous substance.

A substance which is subdivided or dispersed is called a "Dispersoid." In order to illustrate the above definition of colloid, I ask you to kindly look at Ostwald's Schema:



There are, of course, transition states between the above dispersions.

A colloidal solution, or "sol," consists of at least two substances, the dispersoid and the dispersion medium; a colloidal solution is, therefore, a "di-phasic heterogeneous system."

Inasmuch as solids, as well as liquids and gases, can form part of a colloidal system, we distinguish nine different cases, as follows:

Dispersoid	*Medium*	
Solid	Solid	Ruby-glass, Sodium in Sodium Chloride, precious stones.
	Liquid	Suspension—Colloids. (See below.)
	Gas	Cigar and other smoke, cosmic dust.
Liquid	Solid	Water in salts, occluded water in crystals.
	Liquid	Emulsoids. (See below.)
	Gas	Vapors, Clouds—Foams.
Gas	Solid	Gases in lava.
	Liquid	Fog.
	Gas	Not a colloid system.

Of the above, the two systems, Solid-Liquid and Liquid-Liquid have been studied most thoroughly and are of special interest.

The following are the general characteristics of these two systems:

(a) *System:* Solid-liquid, also called "Suspension colloid."
Type: A gold-sol.
(1) Viscosity is about that of the dispersion medium.
(2) They are slightly turbid or opalescent. Under the ultra-microscope we see bright and distinct spheres.
(3) They exhibit Brownian movement, the rapidity of which increases with increase of temperature and decrease of viscosity of dispersion medium.
(4) They have a distinct electric charge. After addition of an electrolyte, they coagulate and separate. They become irreversible, viz., they cannot be brought in suspension again by simple means.
(5) Centrifugation may separate them as fine powder.

(b) *System:* Liquid-liquid, also termed "Emulsion colloid."
Type is solution of albumen in water.
(1) High viscosity (inner fraction). A tremendous increase of viscosity follows a slight concentration. Higher temperature decreases viscosity. For example, on heating a solution of gelatine from 21° C. to 31° C., the viscosity decreases by about 1000 percent.
(2) They foam upon shaking.
(3) They exhibit pseudo-fluorescence, (like suspensoids).
(4) The Ultra-Microscope shows a bright field, particles or spheres are, as a rule, not seen.
(5) They have no distinct electric charge.
(6) They coagulate only upon addition of large amounts of electrolytes.
(7) They may gelatinize or swell.

There are several different ways of classifying colloids, none of which has yet been definitely accepted.

Preparations of Colloids: Inasmuch as the colloids are in degree of dispersion, between coarse suspensions and molecular and ionic solutions, we have two general methods of preparation.

Coarse Suspension Colloid Molecular Sol.

(1) Method of dispersion: We start with a solid or coarse suspension.
(a) Mechanical grinding—Colloidal osmium.
(b) Action of light—colloidal silver.
(c) Action of electric current—colloidal gold, etc.

(2) Method of concentration: We start with one or more molecular solutions and obtain the colloid by chemical reaction. Colloidal silver, gold, barium sulphate, etc.

In using these methods, we obtain at times particles of different sizes; we remove the coarse ones by filtration and the molecular ones by dialysis.

Most metals have been obtained in colloidal solutions, either in water or in organic solvents, such as alcohol, pentane, ethyl-ether or iso-butyl alcohol. Even the radio-active elements, or their salts, have recently (see Kolloid Zeitschrift, Feb., 1914) been prepared in this condition.

The Properties of Colloids. (1) Mechanical properties. They exhibit Brownian movement when observed under the ultra-microscope. This is a dancing, trembling movement discovered by the English botanist Brown in 1827. The motion is back and forth from a fixed central point. Smaller particles move faster than large ones, particles larger than 3-5μ in diameter do not show the motion any more. There are several theories for the cause of this motion; one is that the gravity of the particles is only partially overcome by the viscosity of the medium, that the particles fall or rise until the viscosity of the medium overcomes the gravity and the particles are pushed back again. In coarser suspensions, the gravity overcomes the viscosity and a separation takes place, viz., cream, in which the particles of butterfat are 2-10μ in diameter.

(2) Diffusion: Colloids have been found to diffuse. They differ in this respect from crystalloids only in the rapidity of diffusion.

(3) Osmotic Pressure. The osmotic pressure of colloidal solutions is, as a rule, very slight; some have none at all.

(4) Gravity: The density of colloidal solutions cannot be calculated from the density of the dispersoid and that of the medium. Dispersoids show, as a rule, a volume contraction and the density increases with increasing dispersion. J. Rose determined the following figures for gold:

Gold, melted and pressed	19.33
Gold, by oxalic acid	19.49
Gold, by $FeSO_4$—finest powder	19.55–20.71

(5) Optical properties: Most colloidal solutions appear to be clear and transparent when viewed with the naked eye. Often, a turbidity, fluorescence or opalescence can be noticed, especially in reflected light. A ray of strong light sent through a solution of this kind, will show the "Tyndall phenomenon," viz., the light is repeatedly reflected and polarized. The ultra-microscope is constructed so that all rays, except those reflected from the suspended particles, are excluded. We see the "halo," so to say, of the particles. The color of the colloidal solution varies with the degree of dispersion. System Liquid-liquid most often appears whitish to pale yellow. Gold "sols" may be violet, red, blue, green, orange. The intensity of the color is measured by the amount of white which must be added to get a certain tint.

(6) Electric Properties: The disperse-phase is charged either positively or negatively.

Positive charge have: Metal hydroxides, silicic acid and certain dyes like methylene blue.

Negative charge have: Metals and their sulfides, dyes like indigo, eosin, fuchsin, also starch, mastic and acacia.

Filter paper in water becomes negatively charged—a substance, therefore, which does not ascend the filter paper by capillarity, is positive in charge, viz., it coagulates on the paper.

The kind of charge is usually stated for water, for it may be different in other solvents; for example, it is the opposite charge from that in oil of turpentine. Graphite in oil is positive, in water it is negative. Addition of certain substances may reverse the electric charge; albumin becomes negative by addition of an alkali; it becomes positive on addition of an acid. In passing the electric current through a colloidal solution, the particles travel either to the anode or cathode, according to their charge. This is Electro-osmosis or Kataphoresis. Colloidal solutions conduct electricity considerably less than dissociated solutions. The addition of a so-called "protective colloid," such as albumose, acacia, etc., imparts to the dispersoid the charge of the protective colloid. So, collargol, lysargin and other colloidal preparations carry the charge of the protective colloid used.

(7) Jellification: Under this head we distinguish (a) setting, and (b) swelling.

The setting or jellifying of colloidal solutions is due to changes in the internal dispersion and in hydration. Setting takes place upon warming and consequent concentration, or upon the addition of electrolytes. The amount of the latter must exceed certain minimal values and amounts, which differ greatly with the nature of colloid as well as electrolyte. Hydrophilous colloids increase their volume on being brought in contact with water—they swell. This swelling may go on to such an extent that the particles of the substance are torn apart and a colloidal solution results, or it may reach a certain limit and then stop. The setting and swelling of colloids is a very important phenomenon. Every substance or organ has a certain definite swelling-value, which may counter-balance or even overcome osmotic pressure. The force of swelling is often very great. Ostwald states that swelling peas lifted the cover of an iron pot which had been weighted down with 83.5 Kg. The swelling-pressure of starch has been found to be equal to a pressure of 2523 atmospheres. The old Egyptians drove wooden sticks into stones and poured water in them. The swelling of the wood broke the stones, which were used for building purposes. The curling of gelatine-films is due to a swelling, also the straightening or curling of hair in dry or moist air respectively. Interesting work has been done on the structure of jellies. When we dissolve a small amount of gelatine in a mixture of alcohol and water and allow to cool slowly, we note under the microscope, that small semi-liquid drops separate and, as their number increases, they adhere to one another and finally form a net-like structure. By varying the amount of the gelatine, we get slightly different results, but we find that jellies are sponge-like colloidial structures filled with colloidal solution.

Salts, or acids, or bases—in short, electrolytes, have great influence upon swelling.

Acids and alkalis increase swelling, as do many neutral salts. Gelatine swells more in the presence of Magnesium Citrate than in water alone. Calcium Chloride, Hydrochloric Acid and Sodium Hydroxide increase the swelling ca-

pacity very considerably. The cause for this must be sought in the chemical nature of these hydrophilous colloids. They are probably amphoteric, that is they have weak acid and alkali reaction at the same time. By an addition of acid or bases, they form more or less ionized salts, which in turn cause a hydration, or a taking up of water, with subsequent increase in volume. R. Chiari, in Vienna, found that he could distinguish between distilled water and ordinary water, by means of the degree of swelling of purified globulin, which he found to be very sensitive to electrolytes.

(8) Coagulation: When we boil a solution of albumin, or add Ammonium Sulphate, we coagulate the albumen. Coagulation is an electrical phenomenon conditioned by colloids of different electric charge or by electrolytes. The amount of electrolytes must, however, exceed certain minimum values.

Gold or platinum "hydrosols" can be coagulated by Ferric or Aluminum hydroxide "hydrosols," provided the amounts added are such as to exactly neutralize the electric charge of each other. A 1/10,000 percent solution of gelatine will coagulate a mastic emulsion; if more is added the gelatine will act as a protective colloid.

(9) Pectization is the gradual resolution of substances into the colloid condition: for example, when we treat silver or mercurous iodide with solutions of potassium iodide of different strengths, we will get a colloidal solution. Szillard, of Paris, has made a large number of interesting experiments in which he tried to prove that inorganic substances can act like albumens.

(10) Adsorption: We are all familiar with the property of charcoal to condense large volumes of gases, or to take coloring matter out of solutions; the various silicates, like fuller's earth, kaolin, etc., can be used for the same purpose. Gelatine and isinglass can also be used for clarification or decoloration. The analyst knows that the concentration of certain salts (viz., lead), is reduced upon filtration through paper. These phenomena are classed as adsorption phenomena and are due like many other properties of colloids to their tremendously large surface development. A cubic centimetre of a substance reduced to colloidal dispersion has a total surface of 600 square metres and the surface forces of the colloids are, therefore, very pronounced. Adsorption is caused by a decrease in the surface tension of the solvent conditioned by the dispersed substance, or a third substance added. Quincke showed that a substance which causes a decrease in surface tension of a colloidal solution, has a tendency to travel to the dispersoid phase and form a sort of covering around it.

Fats, fatty acids, albumen and its decomposition-products, decrease the surface tension of water very considerably and are also readily adsorbed. It appears that adsorption is a physical phenomenon and that no chemical process plays any part. Ostwald, to emphasize this, has termed it "Mechanical absorption."

(11) Reactions in jellies: When we allow chemical reactions to take place in jellies, we find that the reaction-product separates out in ring forms, which rings appear in periods. A gelatine "gel" containing potassium dichromate, with a solution of silver nitrate on top of it, will slowly show the yellow rings of silver chromate. Such rings are called "Liesegangs rings" after the scientist who investigated them most thoroughly.

On reviewing what I have told you so far about the preparation and properties of colloids, I find that I have omitted much that is important and exceedingly interesting, but I must hurry. I hope, however, that another opportunity will present itself to take some one certain phase of colloid-chemistry and go into it more thoroughly. Time does not permit me to tell you anything about the methods of colloid research. Most of them are directed, of course, by the properties of colloids. Splendid and very promising results have been obtained by the method of ultra-filtration devised by Bechold. In fact, colloid chemistry has opened a field of research which is tremendously large.

There is no science in which colloid chemistry does not enter in some way or other, and as a system of knowledge it is of the utmost importance. Each of us here is a fine example of a heterogeneous polyphasic colloid system; so is the chair on which you sit, the nails which hold the pieces of wood together and the glue which lends stability. You arise in the morning—the linen of your bedding, the feathers of your pillows are colloids, you proceed to bathe and use soap—again a colloidal process. You have your breakfast which consists of colloids; digestion sets in—again a colloidal process; the cigar you smoke and the smoke you exhale are colloidal systems—and so on and on. To still more emphasize the importance of colloids, I beg leave to say a few words about their uses in the various arts and sciences.

Cookery and Foods: The kitchen is a great colloidal-chemical laboratory. Meat of young animals is richer in juice and of softer tissue than that of older animals. This depends upon the swelling value of the tissues, which value changes with the age. Meat, on boiling, loses 20-30 percent of its weight of water—no doubt a dehydration of a colloid. On frying meat, a heat coagulation prevents the loss of juice. Artificial foods are now classed according to their content of carbohydrates and nitrogen. The colloid chemist will classify them according to their swelling value, upon which depends primarily the degree to which a food can be readily absorbed. Milk will be examined as to its surface tension and viscosity, which show abnormal fat and protein contents. Addition of water is detected by coagulation with calcium chloride and the refractometer; the amount of milk sugar is estimated by the polariscope after removal of the milk colloids with colloidal ferric hydroxide. Cheese is albumen colloidally dissolved in milk; the determination of the swelling-values of the different cheeses will, no doubt, solve the question of their digestibility. Bread and beer are colloidal preparations which are now being investigated. The taste of beer depends on its viscosity, due to colloids, and its electrolytes. The brewing water used, seems to have considerable influence upon the taste.

Mineralogy: Most precious stones owe their colors to minute quantities of a colloid substance, viz., in topaz?sapphire we have colloidal cobalt oxide, in ruby, chromium oxide. The opal is a "gel."

Metals: Steel is a system: Iron-Carbon-Iron Carbide. Tungsten filaments were made by pressing tungsten together with dextrin or syrup through small openings into wire form. The filament was then subjected to high heat to carbonize the organic material. Kuzel has improved this method by preparing a "tungsten-gel" by alternate action of acid and alkali upon finely powdered

tungsten. This is pressed into filaments and gives splendid results in the Tungsten lamp.

Dyeing and tanning are purely colloidal processes and our knowledge of these most important subjects has been considerably enriched by colloid chemistry.

The setting of cement is a colloidal process; pottery and porcelain ware are colloidal substances.

Photo-chemistry has made tremendous progress since Luppo-Cramer, of Dresden, has applied colloid chemical methods to its research.

Cellulose and its preparations are colloids: Parchment paper swells in presence of acid, mercerized silk in sodium hydroxide. A solution of cellulose in copper-ammonia solvent, is a colloidal solution. Rubber is a colloidal system Vulcanization is an adsorption of sulphur by rubber.

To come nearer home: Enzyme-action is a colloidal process, so are the various immunity reactions, the Wassermann reaction, for example.

The urine, the blood, as well as all other body fluids are colloidal solutions.

Martin H. Fischer, of Cincinnati, has made very interesting experiments on the cause of œdema and finds that all swellings of parts of the body are due to abnormal acid production, which is again a colloidal phenomenon. He also finds that nephritis is caused by abnormal productions of lactic acid, which causes the kidney tissues to become soft and the appearance of albumen in the urine. The application of colloid-chemical methods has proved most fruitful in explaining the causes of many physiological phenomena, viz., muscle contraction, ossification, formation of gall-stones, disturbances of circulation, etc. Under the heading, "Importance of Colloids to Pharmacy," we must consider first of all the remedies which are colloidal and are supplied by the pharmacist. The first one of these was Ung. Credé, which appeared in the market in 1896, and from then on, and especially in the last few years, colloidal remedies have been put forth, one after another, so that to-day we have a very large number of them, and with them has come a voluminous literature of their own. French physicians and pharmacists are especially prolific, and a French firm now puts on the market the following:

Electrargol	Colloidal	silver stabilized
Electraurol	"	gold "
Electroplatinol	"	platinum "
Electropalladiol	"	palladium "
Electrocuprol	"	copper "
Electroselenium	"	selenium "
Electromartiol	"	iron "

They are also investigating, at the present time, the physiological activities of

Electrotellurol.....	Tellurium	Also, Thallium
" indiol.....	Indium	Cadmium
" uraniol.....	Uranium	Lead
" vanadiol....	Vanadium	Aluminum
" manganese..	Manganese	Oxides of heavy metals and
" cobalt.....	Cobalt	ferrocyanides, etc., all in
" nickel.....	Nickel	the colloidal state

The larger pharmaceutical manufacturers of England, Germany and the United States have also taken up the manufacture of such preparations. Names like

Collargol, Lysargin, Protargol, etc., are familiar to us. Collargol is prepared by reducing silver nitrite with ferrous citrate in the presence of dextrin, which acts as a stabilizer. Lysargin contains metallic silver protected by the sodium salt of lysalbinic acid. As to the action of these preparations, we may say in general that they have the same physiological activity as their salts would have in diluted solution, viz., colloidal silver is used as an antiseptic, colloidal iron is recommended for the different forms of anæmia. One of the prominent features of their activity is a certain catalytic action which they exert. Palladium colloid, for example, is now used for obesity. It seems to stimulate the oxidation processes of the body and it has been found that intravenous injection of this colloidal metal is followed by a considerable loss in weight. No bad side-effects whatsoever have been reported.

Considering next the time-honored remedies prepared by the pharmacist, I believe that I do not overstate matters when I say that fully 80 percent of all of our pharmaceutical preparations are colloidal. Our gums, resins, and many alkaloids will form colloidal solution by simply mixing with a solvent. We use gelatine, gum acacia, tragacanth, etc., to stabilize preparations. Emulsions, most liniments, our collodions are colloidal preparations. All of our fluidextracts, most of our tinctures and syrups, as well as glycerites, are colloidal preparations.

I will cite specific cases, which show that the pharmacist has made and is making daily use of colloid chemistry.

You prepare Peppermint Water by rubbing up the oil with purified talcum—you increase the surface of the oil so that it may be dissolved in the water—this is a colloidal solution—a colloidal-chemical process has been made use of. You make an emulsion by shaking up in a dry bottle some oil of turpentine with tragacanth and then add water and again shaking. This is colloid-chemistry—the system, oil-water, is stabilized by the tragacanth, which is adsorbed at the boundary lines of the two liquids and thereby forms a covering around the globule of oil. The stability of an emulsion is directly proportional to the dispersion of the oil. You prepare liniment of ammonia. The ammonium oleate formed, decreases the tension of the cotton seed oil toward the water and is, therefore, absorbed at the boundary line of the system, oil-water. You prepare vinegar of squills and boil it—the coagulation of the albumin is a colloidal process. We add alkalis to fluidextracts of senega and taraxacum, to prevent pectization. We know that alcohol or salts in certain amounts, will crack emulsions; this is due to the dehydration of the colloid and subsequent coagulation. We distinguish between solution of ferric sulphate and Monsel's solution, by addition of sulphuric acid—this is a colloid-chemical test. Monsel's solution is a colloidal solution which is coagulated by the electrolyte H_2SO_4.

Cold cream is a colloid-system water-fat. The water, the dispersed phase, is dissolved in the fat. We know that only such substances as are soluble in fat, are absorbed by the skin, and the principal action of cold cream depends upon its water contents.

Ferric hydroxide is used as arsenic-antidote because it adsorbes arsenous acid.

And so I could go on and on and recite to you manipulation after manipulation, test after test, used by pharmacists and belonging strictly to the field of colloid-chemistry.

What a field of research lies here before us! The scientific pharmacy of the future will be in a position to determine in advance what the action of certain remedies will be or, how certain remedies must be modified, to exert certain actions, or to make them more stable and presentable. Professor Thoms, of the University of Berlin, in a lecture delivered before the German Pharmaceutical Association, pleaded for more active participation of the pharmacists in researches of biologic standardization. Without wishing to detract one iota from his arguments, I want to call to your attention that in colloid-chemistry there is a field of research for the pharmacist which is not alone of interest and value, but also full of promise of reward.

The lecturer carried out the following experiments to illustrate his remarks:

Preparation of colloidal gold and of colloidal silver by the electric spark under water.

Preparation of colloidal gold and silver in different colors by chemical means.

The Tyndall phenomenon in gold "sols," in cigar smoke and other colloidal systems.

Different forms of dialysers—sausage—thimble—filters—parchment—collodion, etc.

A number of Liesegang's rings and LeDuc's figures.

Preparation of coagulated colloidal Ferric Hydroxide.

Preparation of gelatinous Barium Sulphate, gelatinous charcoal, etc.

LIQUID PETROLEUM OR "RUSSIAN MINERAL OIL."*

Petroleum has been in use as a medicine from time immemorial. It was known to Herodotus 400 years before Christ and is mentioned by Plutarch, Dioscorides, Pliny and other early writers. It was extensively used by the Arabians and evidently played an important part in the practice of medicine in India, being known to the Bengalese as "Muthe Katel." The raw product was the substance used in earlier times and differed much in character and composition, as obtained from different sources.

As an internal remedy it was early employed in chronic pulmonary affections, in obstinate skin diseases, in rheumatism, and for the expelling of tapeworms. It was extensively used for these several purposes in France under the name "Oleum Gabianum" and in North America as "Seneka oil." The internal use of the refined product may be traced to a patent granted to Robert A. Chesebrough of New York, in June, 1872, for the manufacture of a "new and useful product from petroleum, named vaseline." This name was originally applied only to a semi-solid preparation, but later a liquid products known as liquid vaseline was marketed and for a time exploited as a cure for coughs, colds, consumption and a number of other diseases and conditions.

The liquid petrolatum has since become known under a variety of names, proprietary and otherwise, in addition to being used as a substitute or an adulter-

*From the Journal of the A. M. A., May 30, 1914.

ant for other, more costly, fats and oils. Some of the names applied to the product are:

Adepsine oil
Amilee
Atoleine
Atolin
Blandine
Crysmalin
Deeline
Glyco
Glycoline
Glymol
Heavy Petroleum Oil
Liquid Albolene
Liquid Cosmoline
Liquid Fossiline
Liquid Geoline
Liquid Paraffin
Liquid Petrolatum
Liquid Saxoline
Liquid Vaseline
Mineral Glycerin
Mineral Oil
Neutralol
Olo
Paraffin Oil
Paroline
Petralol
Petro
Petrolax
Petrolia
Petronol
Petrosio
Rock Oil
Russian Liquid Petrolatum
Russian Mineral Oil
Russian Paraffin Oil
Russol
Saxol
Terraline
Terralbolia
Usoline
Waterwhite-Mineral Oil
White Paraffin Oil

A preparation similar to that official in the Pharmacopœia of the United States as liquid petrolatum has been included in many, if not all, of the foreign pharmacopœias, the official title under which this preparation is recognized being as follows:

Petrolatum liquidum, U. S. Pharmacopœia; Paraffinum liquidum, pharmacopœias of Great Britain, Germany, the Netherlands, Japan, Belgium, Austria, Denmark, Switzerland, Sweden, Servia, Italy, Hungary and Russia; Oleum Paraffinæ, Spanish Pharmacopœia; Vaselinum liquidum, French Pharmacopœia, and Oleum Vaselini (as a synonym) pharmacopœias of Denmark and Russia.

The requirements of the several pharmacopœias differ somewhat and the specific gravity as given is as follows:

U. S. P. VIII, 1905	0.870	to	0.940	at 25°
Ph. Brit. IV, 1895	0.885	to	0.890	at 15.5°
B. P. C. II, 1911, usually	0.875	or	lower	at 15°
Ph. Germ. V, 1910, at least	0.885			at 15°
Ph. Ross. VI, 1910	0.880	to	0.885	at 15°
Ph. Hung. III, 1909	0.88	to	0.89	at 15°
Ph. Ital. III, 1909	0.875	to	0.890	at 15°
Ph. Fr. V, 1908, about	0.875			at 15°
Ph. Serb. II, 1908, about	0.880			at 15°
Ph. Svec. IX, 1908	0.88	to	0.90	at 15°
Ph. Helv. IV, 1907	0.880	to	0.885	at 15°
Ph. Dan. VII, 1907, at least	0.880			at 15°
Ph. Austr. VIII, 1906, at least	0.880			at 15°
Ph. Belg. III, 1906, not below	0.880			at 15°
Ph. Japon. III, 1906	0.875	to	0.945	at 15°
Ph. Ndl. IV, 1905, not below	0.860			at 15°
Ph. Hisp. VII, 1905	0.840			at 15°

For pharmaceutical purposes, liquid petroleum may be divided into two grades, the lighter or more limpid oil, used extensively as a vehicle for oil sprays, and the heavier, more viscid oil generally recognized in European pharmacopœias and used as an ingredient of ointments and more recently as a remedy in the treatment of intestinal stasis.

Under petrolatum liquidum the U. S. P. recognizes a mixture of hydrocarbons, chiefly of the methane series, which occurs as a colorless or very slightly yellowish, oily, transparent liquid without odor or taste and having a specific gravity of about 0.870 to 0.940 at 25 C. For the U. S. P. IX, it is proposed to change this requirement somewhat so as to have it apply to a transparent liquid free from fluorescence, without odor or taste and having a specific gravity of from 0.845 to 0.940 at 25 C.

Such a requirement would include all of the available paraffin oils irrespective of origin. The now commonly available commercial liquid petrolatum, used for pharmaceutical purposes, is practically colorless and all of the better grade are free from odor or taste. The specific gravity varies from 0.855 to 0.895. The lighter oils, having a specific gravity of from 0.860 to 0.870, are usually preferred in the making of oil sprays or solutions of substances to be used as local applications. The product having a specific gravity above 0.875 evidently contains a considerable amount of dissolved solid paraffin which separates out at temperatures at or below 0 C., but readily dissolves again at temperatures above 10 C.

There is considerable difference in the chemical composition of the paraffin oils obtained from various sources. The American oil consists largely of hydrocarbons of the methane series, while the Russian oil contains naphthenes or hydrocarbons of the benzene series, having the empirical composition of ethylene (CnH_2n) which may be considered as hydrogenated aromatic hydrocarbons, though they behave with reagents very much in the same way as do the hydrocarbons of the methane series.

Mineral oils with a naphthene base are best suited for making white petrolatum, and at the present time the production of the colorless water-white liquid petrolatum appears to be confined largely or almost exclusively to the crude product of the Baku district of Russia, though it is asserted that it is now also made from the Hanover (Germany) crude oil and that some is being produced by "cracking" the white solid paraffin.

It is also said that the American oil can be made water-white but that it is not being so produced at present for economic reasons; the yellowish oil, free from fluorescence, having a very wide sale, both as a lubricant and as a substitute for lard oil and other of the more costly lubricating oils.

From a pharmaceutical point of view it would appear important to note the physical characteristics of the oil and to insist on absence of color, absence of odor and taste, absence of acid and of alkali and a specific gravity in harmony with the purposes for which the oil is to be used.

During the past year or two liquid petrolatum has attracted considerable attention as a remedy in the treatment of intestinal stasis or chronic constipation, the practice of using it having been developed largely through its recommendation by Sir W. Arbuthnot Lane and his associates. This use of liquid petrolatum and of petrolatum products generally is by no means novel. N. A. Randolph,[1] of Philadelphia, was among the first to suggest its use for this purpose in an article published in 1885. Randolph also appears to have been the first to experiment with petrolatum and to determine its non-absorbability from the intestinal tract.

[1]Randolph, N. A.: Therap. Gaz., 1885, ix, 732.

In an article[2] in 1884 he concludes that "pure petrolatum while entirely unirritating to the digestive tract is valueless as a foodstuff."

The experiments recorded by Randolph were evidently prompted by the fact that vaseline and a number of imitation products then on the market were being sold as substitutes for lard and butter, and opinions regarding the food value of petroleum products appear to have differed very materially. Following the experiments of Randolph, Robert Hutchison in 1899 made a series of experiments to demonstrate that petroleum, petrolatum, paraffin and related products were absolutely unassailable by any of the digestive fluids, despite the "large vogue that had of late years been given to various petroleum emulsions, chiefly by ingenious and unterrified advertising." He came to practically the same conclusions arrived at by Randolph fifteen years earlier and pointed out that "liquid paraffin in one sense may be regarded as an artificial intestinal mucus and might in that way have some value on certain forms of constipation."

William Duffield Robinson[3] reports on the use of a perfectly refined colorless and odorless petrolatum, supposedly of American origin. He was able to show that all of the product passed unchanged through the intestinal tract and could be regained from the feces. In his conclusions he expressed the belief that the effect of the administration of these petroleum products is far more than as a simple intestinal lubricant. In over fifty selected cases in which nutrition, digestion and body-weight were impaired, and the purest oil administered in 1- or 2-dram doses each day for a period of from four to six months, there was in every instance an improvement of weight, health and feeling of well-being. The administration of refined paraffin oil gave no discomfort in any instance, even in cases in which nearly a pint was given in a few hours.

William Ewart[4] suggests liquid paraffin as a safe agent for the local treatment of the lesions in typhoid fever. He says in part: "Mineral oil, such as petrolatum or paraffin, is neither absorbed nor dissolved; therefore, after all absorbable ingestions are taken up by the lacteals, it will still remain in the bowel. In this way pure liquid paraffin is valuable, precisely because it is inert; moreover, it might some day, perhaps, be made the vehicle for effective topical remedies."

A. D. Schmidt[5] quotes Stubenrath as having given liquid paraffin in the treatment of chronic constipation, and he himself gave as much as 20 gm. of liquid paraffin to adults without observing any injurious effect whatever. He says, "As a result of the administration of liquid paraffin, the feces are softened considerably and are found under the microscope to contain numerous minute globules of paraffin." He was, however, unable to recover from the feces the entire quantity of paraffin administered and believes that a certain portion of it, probably the fractions with a low boiling-point, are absorbed or possibly oxidized in the organism.

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[2]Randolph, N. A.: Proc. Acad. Nat. Sc., Philadelphia, 1884, p. 281.

[3]Robinson, William Duffield: Med. News, 1900, lxxvii, 56.

[4]Ewart, William: Brit. Med. Jour., 1902, ii, 1505.

[5]Schmidt, A. D.: München. med. Wchnschr., 1905, lii, 1970.

Maurice Vejux Tyrode[6] also refers to the use of liquid petroleum in the treatment of constipation.

Sir W. Arbuthnot Lane in his recommendations of liquid petrolatum calls it an ideal remedy for stasis, but cautions against the use of the lighter oil as extensively prescribed in this country as a vehicle for sprays in nose and throat work.

Paraffin oil is not absorbed from the alimentary tract and so far as known exerts no deleterious influence. It is usually given in quantities of from 10 to 20 cc. half an hour or an hour before meals or in larger doses, from 30 to 50 cc., at one time on retiring. From available evidence it appears that comparatively huge doses may be administered without the production of any untoward results. According to many observers, liquid paraffin should not be given with or after meals because of the inhibiting influence that it may have on the digestion of food. It is not soluble in water or the ordinary solvents and therefore cannot be diluted. The denser oils are preferably slightly warmed or drunk with warm water so as to obviate the disagreeable slimy sensation that persists when taken cold.

Volatile oils may be used in moderate amounts to give a distinctive taste to the otherwise rather insipidly tasteless paraffin oil. Among the more desirable oils to be used for this purpose would be oil of peppermint, oil of cinnamon, oil of betula or methyl salicylate and oil of cloves. From 2 to 10 drops of any of these oils can be added to a pint of the oil. When larger doses of the oil are to be given at one time, it would, of course, be advisable to use a comparatively smaller quantity of the volatile oil as a flavor.[7]

From the foregoing it would appear that apart from the Pharmacopœia of the United States, practically all other known pharmacopœias describe a water-white mineral oil under the title "Paraffinum Liquidum" or "Liquid Paraffin" as a colorless, odorless, tasteless, non-fluorescent, oily liquid, free from acids, alkalies and organic impurities. As explained before, the specific gravity of the preparation as recognized in other countries and as offered on the American market at the present time varies considerably, and there appears to be some difference of opinion as to the exact nature of the product that is preferable for use for different purposes. This matter requires further investigation.

Since the definition of liquid petrolatum in the U. S. Pharmacopœia permits the use of fluorescent products of widely varying specific gravities, it is recommended that physicians who desire the water-white non-fluorescent (Russian)

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[6]Tyrode, Maurice Vejux: Boston Med. and Surg. Jour., 1910, clxii, 673.

[7]In addition to the articles referred to in the preceding footnotes, the following are of interest in connection with this subject:

Editorial, Therap. Gaz., 1885, ix, 353.
Junker, F. A.: Med. Record, London, 1885, xiii, 506.
Editorial, Med. News, 1886, xlviii, 105.
Dunbar: Deutsch. med. Wchnschr., 1896, xxii, 33.
Stubenrath, Franz Casimir: München. med. Wchnschr., 1897, xliv, 639.
London Letter, Med. News, 1899, lxxiv, 504.
Hutchison, Robert: Brit. Med. Jour., 1899, i, 724.
Schlesinger, E. G.: Boston Med. and Surg. Jour., 1913, clxix, 14.
Lane, W. Arbuthnot: Brit. Med. Jour., 1913, ii, 1126; Proc. Roy. Soc. Med., 1913, vi, 49; Surg. Gynec. and Obst., 1913, xvi, No. 6.
Jordan, Alfred C.: Practitioner, London, February, 1913.
Chrysospathes, J. G.: Zentralbl. f. Chir., 1913, No. 45; abstr., The Journal A. M. A., Dec. 13, 1913, p. 2201.

mineral oil should use the term "Petrolatum Liquidum, Grave," or "Paraffin Liquidum, B. P.," if the heavy product recommended by Lane is desired, and "Petrolatum Liquidum, Leve" if the light varieties are required. It is further recommended that under the foregoing names, manufacturers and pharmacists be requested to dispense the products, in accordance with the following descriptions:

Petrolatum Liquidum, Grave.—Heavy (Russian) Liquid Petrolatum.—Paraffinum Liquidum, B. P., liquid paraffin.—A transparent, colorless, tasteless, non-fluorescent, oily liquid, odorless when cold but giving off a faint petroleum odor on heating. This preparation should correspond to the requirements of the British Pharmacopœia for liquid paraffin and have a specific gravity of about 0.885 to 0.890 at 15 C. It is insoluble in water or alcohol, but soluble in boiling absolute alcohol and readily soluble in ether, chloroform, carbon disulphide, petroleum benzin, benzene and fixed and volatile oils. It serves as a solvent for volatile oils and related substances like camphor, menthol and thymol.

This is the type of preparation used by Sir W. Arbuthnot Lane, and his associates for internal administration. It is also used as a basis for ointments and salves and as a local application to wounds, ulcers and in certain forms of skin diseases in which a simple protective is desired.

Petrolatum Liquidum, Leve.—Light (Russian)—Liquid Petrolatum.—A transparent, colorless, tasteless, non-fluorescent, oily liquid, odorless when cold, but giving off a faint petroleum odor on heating. In other respects this preparation should correspond to the pharmacopœial tests for liquid petrolatum and have a specific gravity of about 0.860 to 0.875, at 15 C. Like the heavy variety of liquid petrolatum, it is insoluble in water and alcohol, but soluble in boiling absolute alcohol and readily soluble in ether, chloroform, carbon disulphide, petroleum benzin, benzene and fixed and volatile oils. It serves as a solvent for volatile oils and related substances like camphor, menthol and thymol.

This is a type of preparation extensively used as a vehicle for the oily sprays in nose and throat work. It is also being used as one of the constituents in the now popular paraffin oil cold cream and has been used to some extent for internal administration in the treatment of chronic stasis. Being more limpid than the preparation preferred by Lane, it is more readily taken, though greater care must be exercised in securing a sample devoid of the lighter fractions of petroleum distillates.

The mystic chords of memory, stretching from every battle-field and patriot-grave to every living heart and hearth-stone all over this broad land, will yet swell the chorus of the Union, when again touched, as surely they will be by the better angels of our nature.—*Abraham Lincoln.*

CHEMICAL AND PHARMACAL ARTS IN THE PALACE OF LIBERAL ARTS AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.

In so large a division of industries as those assembled under the caption "Chemicals, Drugs, Dyes, and Medicines," it is difficult to obtain figures that have a direct comparative value. There are so many articles of manufacture that even in showing, extent, or volume, there is necessarily much duplication of total amounts, the finished product in one class or group becoming the raw material of another. For purposes of classification the Thirteenth Census includes thirty classes under the group denominated "chemicals and allied products."

In considering the statistical analysis, to be shown immediately, of this great group it will at once become apparent how intimately they are associated with the daily life of the people. The very existence of some of the classes, as established parts of our commercial system, is important knowledge to the masses. And by the same token, to gather together a characteristic representation thereof, as will be done in the Liberal Arts Palace of the Exposition, must confer a lasting benefit upon the people. Science, it may be said, applied to manufacture, takes no backward step. Even the abandonment of a compound, for the use of a newer and better one, marks a step in development. And here one people teaches another by universal displays of these pseudo-arts. An exposition, especially one emphasizing modernity in processes, becomes a world's laboratory. Inventive science, everywhere, is stimulated to the production of a like compound, and, thus stimulated, often produces a better one. And the light spreads, until the whole earth is illuminated by the idea, and its use becomes the common property of all men. In this the Liberal Arts' displays takes place second to none.

The sale of drugs throughout the world illustrates the principle of mutual benefit in trade, which may be stated by paraphrasing the socialistic propaganda, "from each people according to ability, to each people according to need." Drughouses have their buyers in all parts of world. In laboratories of the nations, lies advancement in almost every public utility. The dissemination of this knowledge, by means of national exhibits, at an universal exposition, becomes a state problem. Just to know where to buy the anti-toxins, which have been discovered and developed for use in the free clinics of civic institutions, is of immediate and never-ending benefit to the people. Even the new work in social science, depends upon investigations in these departments of physical science.

We introduce here as comprehensive of this group of industries the following figures: In all there are 9427 establishments engaged in manufacture. These employ 237,988 wage earners (average number) and turn out products valued at $1,111,915,753. Of these establishments the drug trade is especially interested in the following: Chemicals, 349 establishments, product $117,688,887; drug grinding, 25 establishments, product $6,006,999; oil, castor, 4 establishments, product $904,825; oil, cottonseed, and cake, 817 establishments, product $147,867,894; oil, essential, 68 establishments, product $1,737,234; oil, linseed, 29 es-

tablishments, product $36,738,694; oil, not elsewhere specified, 189 establishments, product $30,865,122; patent medicines and compounds and druggists' preparations, 3,642 establishments, product $141,941,602; petroleum, refining, 147 establishments, product $256,997,659; soap, 421 establishments, product $111,357,777; sulphuric, nitric, and mixed acids, 42 establishments, product $9,884,057; turpentine and rosin, 1,585 establishments, product $25,295,017; wood distillation, not including turpentine and rosin, 120 establishments, product $9,736,998.

In the class "chemicals" are included "acids, except sulphuric, nitric, and mixed acids, and such as are made by establishments in the wood-distillation industry; sodas; potashes, alums, coal-tar products; cyanides, bleaching materials; chemical substances made by electrical processes; plastics; compressed or liquified gases; fine chemicals, and all chemicals not covered by other more specific classifications"; "wood distillation, etc." includes pyroligneous acid, wood alcohol, acetates, tar, and charcoal made by the destructive distillation of wood in closed vessels at a red heat"; tanning extracts and liquors, including chrome tanning solutions; and mordants, sizes, gums, and dextrins"; and continuing through the list, which we have not space to specify further.

In group 36, chemical and pharmacal arts, Liberal Arts Palace, there were originally twenty-four classes, but not all the products in the census classification are included therein, part of them appearing in the Palace of Manufactures, Agriculture, and Mines and Metallurgy. The revised classification in the Liberal Arts Palace, contains twenty-one classes, showing equipment, processes and products, as follows:

"Class 148. Laboratory apparatus and utensils; lamps, blowpipes, presses, drying ovens, filters, furnaces, ovens, etc., used in chemical laboratory work.

"Class 149. Apparatus and instruments for making industrial and commercial analyses.

"Class 150. Equipment and processes used in the chemical treatment of animal substances, with their products; super-phosphates, soaps, candles, glycerine.

"Class 151. Apparatus and processes for the production by electrolysis of hydrogen peroxide, chlorine, hypochlorites, chlorates, soda, bleaching materials, and various other chemicals. Also electro-thermal apparatus and processes for chemical manufacture not otherwise specified.

"Class 152. Equipment and processes used in the manufacture of vegetable essences.

"Class 154. By-products for pharmacal use, obtained from the treatment of mineral substances, such as petroleum and coal tar derivatives, etc.

"Class 155. Equipment and processes used in treating waste matter from factories (by chemical or electrical methods), with a view to permitting their return to water courses or to the atmosphere.

"Class 156. Equipment for charcoal-work and the production of its various derivatives; methylated spirits, acetone, acetic acid, tar, wood alcohol, pyroligneous acid. Products of charcoal burning.

"Class 157. Apparatus and processes for the compression and liquefaction of gas. Liquified gases.

"Class 158. Apparatus and processes for the manufacture of artificial textiles.

"Class 159. Appliances and processes used in the manufacture of pharmacal products. Raw materials of pharmacy; sera and other biological products, as

bacterins, vaccins, tuberculins, etc.; drugs of mineral, animal and vegetable origin; crude, powdered and compound; special appliances for collecting, cleaning, peeling, slicing, cutting and garbling crude drugs.

"Class 160. Disinfectants; standardization of disinfectants; manufacture of disinfectants; drug preservation; drug sterilization; ampouls, etc.

"Class 161. Acids, alkalies, salts and compounds of every kind. Chemical elements derived from their compounds and chemical compounds not otherwise classified.

"Class 162. Refined sulphur and derivatives from sulphur.

"Class 163. Equipment and processes used, and products obtained, in the manufacture of phosphorus and matches.

"Class 164. Drug adulteration; methods of adulteration; methods of detecting adulteration.

"Class 165. Various products of chemical industries; tanning materials, waxes, essential oils, glue and gelatine; perfumes, cosmetics, and extracts; various glazes, printing ink, blacking.

"Class 168. Alcohols modified for industrial purposes.

"Class 169. Equipment and appliances for producing calcium carbide and for the storage of acetylene gas.

"Class 170. Insecticides; fungicides; parasiticides and methods of manufacture and use.

A mere glance at this classification discloses the fact that the showing of all these products is especially designed to benefit the public good. Nowhere in the whole exposition will the "pure food' laws find greater exemplification. Nowhere will the interested individual be better able to relate the whole to his daily living. Municipal authorities will be able to study the methods of amelioration which constitute their abiding problem, by witnessing the direct application of manufacture to use and the relation which the product bears to the public health. Not only this, but the retail druggist will be able to inspect the equipment and processes used in the manufacture of many of the articles which find standard sale over his counters. All of these results insure to the manufacturer-exhibitor a profitable return for the expense and trouble of installing his exhibit. When the fact is added that visitors and dealers from all parts of the world will witness, study and analyze the display, and experts will relate same to foreign markets, the benefits from a commercial point of view are still more apparent.

The infinity of creation is revealed as much by the microscope as the telescope. Science is yet in its infancy. The constitution of matter is not yet fixed. The atom has been succeeded by the electron. Where the material ends and the spiritual begins is a subject of fascinating speculation and fraught (if discovery be possible) with mystic possibilities in the treatment of disease. The germ theory has revolutionized in the short period of twenty-five years the practice of medicine. The chemical engineer, he who studies, long and minutely, crystals and compounds; what, for want of a better name, may be called the affinities of molecules or the laws of attraction and repulsion in material substances, has become a public servant and benefactor. And it behooves the man whose business it is to dispense the result of these labors to the people to keep abreast of every advance. Toxins and anti-toxins are not only in the hands of physicians licensed by the state, but they are in the hands of the pharmacist who must also receive

the permission of the constituted authorities to carry on his business. And general public results are justifying these cautions thrown around the use of all these products, dangerous or salutary, as the case may be.

Indeed, the wonders of modern chemistry are never ending, and the "apothecary shop" of old, has been transformed into a public clinic, from which remedies and compounds are dispensed to the public, for a nominal cost, that have become indispensable, because so well-known and understood by the pharmacist as to become fixed in the public regard. So marvelous are many of the modern discoveries that the ancient alchemist, with his dreams, is no longer the derision of the scientist. The transmutation of metals, in the case of some rare ones recently discovered, has been actually accomplished. Radium is, perhaps, the world's greatest wonder of today. Not all is understood. Effects are produced through the scientific process, which defy analysis, while the result remains. And in the case of some of the well-known disinfectants, results justify a use, when science is unable to explain the transformation.

The public value of the exhibits in this section of the Palace of Liberal Arts, therefore, cannot be overestimated. Foreign governments should see to it that public laboratories make contributions to this highly important department of the coming universal exposition. And manufacturers, by exhibit of their latest products, may reach unlimited markets in remote lands that will justify the investment of largely augmented capital.

LOYALTY.

"First, then, by industry you must fulfil your vow to your country; but all industry and earnestness will be useless unless they are consecrated by your resolution to be, in all things, men of honour; not honour in the common sense only, but in the highest. Rest on the force of the two main words in the great verse, "*Integer* vitae, scelerisque *purus*." You have vowed your life to England; give it to her wholly—a bright, stainless perfect life—a knightly life. Because you have to fight with machines, instead of lances, there may be a necessity for more ghastly danger, but there is none for less worthiness of character than in olden time. You may be true knights, though perhaps not *equites;* you may have to call yourselves 'cannonry' instead of 'chivalry,' but that is no reason you should not call yourselves "true men." So the first thing you have to see to, in becoming soldiers, is that you make yourselves wholly true. Courage is a mere matter of course among well-born youths; but neither truth or gentleness is a matter of course. You must bind them like shields about your neck; you must write them on the tables of your heart. Though it be not exacted of you, yet exact it of yourselves,—this vow of stainless truth."—*John Ruskin, at the Royal Military Academy, Woolwich.*

Education is a better safeguard to liberty than a standing army.—*Everett.*

Papers Presented to Local Branches

PREPARATIONS OF THE NEW U. S. P.*

L. A. BECKER.

The comments which follow are made with the understanding on the part of the writer, that the *text* in the Pharmacopœia should be *concise,* of *positive value* (not valueless or non-essential), and so worded as to exclude all opportunity for quibble or legal interpretation, wherever such an ideal is obtainable.

Following the preparations, in the order published in the April number of the *Journal,* my attention was directed to the requirements for "Aqua."

Using a dilution of Tr. Ferric Chloride with water, (representing Iron, 1-100,000), as test solution, and applying freshly prepared H_2S water, somewhat cloudy with Sulphur, no noticeable change in color or turbidity was shown in several hours; heavy metals should show darkening in 15 minutes, according to the text. This test was made to determine if Iron could be detected by this test, when present in small amounts. On adding Ammonia water, a dark coloration was produced immediately. This is a requirement of the present "U. S. P." heavy metals test.

In the next test for the limit of iron, the statement "no blue coloration should be produced immediately (iron)," needs modification. Since, the application of this test to a 1-100,000 iron solution,—which, by the way, develops a marked color on aging,—does not give a positive result, interpreting the text strictly. It takes about half a minute for a green coloration to show, which develops into a definitely blue coloration in about one minute. This certainly is not "immediately," as any lawyer required to defend this condition would contend, and probably with success.

Iron dilutions of 1-500,000, show a blue coloration in from three and one-half to five minutes; dilutions of 1-1,000,000, show this color in from seven-ten minutes. It is recommended that a definite time be stated, instead of the word "immediately," if this test is to be retained.

It would appear that these two tests establish a ***much less rigid*** standard, than the present "U. S. P." "heavy metals" test, if experimental contaminations serve, as well as those found in nature, as a guide to test them. Under Aqua Destillata, the present standard allows 7.5 Mg. per 100 cc. and not 5 Mg., as reported by the committee in comparison with the new standard of 1 Mg. Thus making the allowable residue, 7.5 times smaller, instead of 5 times, as the published text shows.

*Read before Chicago Branch, May, 1914.

Aqua Destillata Sterilisata: The requirement that only "freshly distilled water" may be used, and the recommendation that it be used "within 48 hours," surely makes its preparation difficult, and expensive for emergency use. One queries why those responsible for the restriction, *"freshly,"* did not go the limit, and insist also on the, "all Jena glass" conditions, usually imposed by those claiming deleterious effects from products of less rigid manufacturing processes.

The medicated waters are all required to be made with recently boiled distilled water. Never having experienced any trouble with these preparations, I fail to see the reason for this, excepting the possibility that water, from which the air and CO_2 are removed, more readily takes up oils to saturation; or it may also be, that it is the purpose to sterilize the water just before using, to secure a better product. This latter, to insure success, requires bacteriological *technique* beyond the average pharmacist's attainment.

Liquor Sodii Chloridi Physiologicus: 8.5 gm. per litre, seems a rather large amount, especially when other salts are also added, to produce Ringer's or Locke's solutions. 7.5 gms.,—the mean between the extremes usually stated, namely, 0.6%-0.9% (from Howell's Physiology), may be less apt to produce hypertonicity than the higher amount. The hardship imposed by requiring freshly distilled water, holds also here and the recommendations regarding sterilization, I fear, will lead to many a dispute between Pharmacist and Physician should the former become the purveyor of this preparation to the latter.

For where there is infection,—where sterilized materials are employed, either instruments, dressings, suture materials, etc., or preparations,—the physician almost invariably seeks to put the blame on any other cause, however far-fetched his reasoning, rather than to ascribe bad results to his possible faulty *technique* or poor judgment. For the pharmacists' protection against accusations of this nature, the process of sterilization should produce unquestionable results, and the most thorough is none too safe. Therefore, I would recommend fractional sterilization—auto-claving from 15-20 minutes on three successive days at 115° to 120° C., or boiling for 1 hour on three successive days—allowing a shorter procedure only on the physician's explicit permission and by his direction. Also I would waive the requirement of freshly distilled water, proper keeping conditions being insisted upon for Aqua Destillata.

Liq. Sodii Arsenatis: The rubric states, "not less than 0.975%, nor more than 1.025%," but the assay requires "not less than 0.95%, nor more than 1.0%"; a discrepancy that ought to be corrected.

I cannot understand why Po. Ext. Cascara Sagrada should be directed to be made only three times the strength of the drug, when four times the strength is usually the requirement, for powdered extracts, and when most manufacturers make them of that strength. Surely pharmacists will not attempt manufacture of this extract when they are buying preparations more easily made.

The method of making Tr. Limonis Corticis and Tr. Aurantii Dulcis will probably meet with popular approval. The present "U. S. P." process for Tr. Nucis Vomicæ certainly insures a more reliable preparation, with the skill required for its manufacture, than making the tincture from the drug, with assay by the pharmacist, will probably produce.

GENERAL CONSIDERATIONS.

The alcoholic preparations of the Pharmacopœia,—fluidextracts, tinctures, spirits, etc., should have the alcohol-content of the finished product stated definitely, and so adjusted that reasonably close adherence to the process would be followed.

There seems to be a tendency to complicate and increase the work in many formulas, without any apparent equivalent gain in the results obtained, for example: Liq. Calcis, Liq. Cresolis Co., Liq. Magnesii Citratis, Spt. Menth. Pip, etc.

In closing, I wish to state that the revision of the preparations—and this may also be found true of the other parts of the book—seem too much "library-made" and not enough "laboratory-made." A thorough and practical revision could be made if the country's most expert talent could be utilized, at times to suit the individual convenience, during the *interim* of the decennial conventions, as workers in laboratories especially arranged for this purpose, housed by the A. Ph. A. Such laboratories should be located in or near some centrally situated metropolis. In such laboratories tests and processes of great value to the profession, could be worked out, to meet conditions of environment similar to those surrounding the pharmacists of the different sections of the country.

PENNSYLVANIA STATE LAWS OTHER THAN PHARMACY LAWS WHICH AFFECT THE RETAIL DRUGGIST.*

CHAS. H. LA WALL, PH. M.

The present era will probably be looked back upon by future historians as the "age of laws." Many laws are now upon our national and state statute books, which class as crimes, acts which in a former generation were looked upon as simply evidences of sharp business practice. These offences, now punishable by law, have been aptly termed "artificial crimes," because many of them are so technical in their character as to attach no moral disgrace to the individual found guilty of committing them.

The necessity for such laws has arisen on account of the complex relations brought about by our modern civilization, and in order to protect the honest, conscientious and upright individual from unjust and unfair competition on the part of those who are accustomed to look upon business from the standpoint of the old maxim *"Caveat emptor,"* and who do not realize that it has been superseded by the modern maxim *"Caveat vendor."*

In many instances fraudulent practices have been developed to such a high degree of perfection, that the buyer is no longer able to act as a competent judge of what he is getting without the aid of expert advice. It is true in some cases these laws work an even greater hardship upon those whom they are designed to protect, than upon those whom they are calculated to punish, but that they

*Read before the Philadelphia Branch, May 5.

have become necessary, to a certain degree, at least, no one will deny, and their elimination will likely be brought about, only by the education of the individual to a point, where universal compliance with the underlying principles will voluntarily exist, through a proper understanding of the necessities of the situation.

All of these laws are mandatory in the highest degree. Wilful violation or guilty knowledge are not necessary to be proven in order to convict an offender. A proof of the violation carries with it a conviction, however innocently the violation may have occurred. The pharmacist in this respect is like the "Jungle Dweller," whose code of laws has been so admirably outlined by Kipling in the poem which concludes thus:

"Now these are the laws of the jungle,
And many and mighty are they;
But the head and the hoof of the law,
And the haunch and the hump is—Obey."

Of the pharmacy laws themselves, I shall assume that the pharmacist has sufficient knowledge, although in this connection there still exist some evidences of carelessness or wilful disregard of requirements which call for correction. I refer here more particularly to the practice of using substances for official or medicinal purposes which are labeled "For technical use only." This overworked phrase has been a haven of refuge for manufacturers and sellers of substandard products, and unfortunately it is too frequently taken to mean that the article is up to the official standard in all but some minor particular, and the warning is forgotten or disregarded. An example of this kind which has come under my observation recently is of powdered magnesium carbonate supplied on an order for "Powdered Magnesium Carbonate, U. S. P." The package received was marked "Magnesium Carbonate, for Technical Use," and examination showed it to contain so much calcium carbonate, as to practically unfit it for any but filtering purposes.

Another case of the same kind, seen a year or so ago, was of gelatin marked "For Technical Use," and containing an amount of arsenic prohibitory to its use in medicinal or food products.

There is one class of products handled by druggists, for which, at the present time, there are no laws to govern the quality. This is the class of toilet preparations, such as soaps, washes, perfumes, creams, etc., for which no remedial properties are claimed and which come therefore neither under the classification of foods or drugs.

Among the Pennsylvania laws which might affect pharmacists is the general food law which prohibits adulterations and misbranding of foods generally. Maraschino cherries, for instance, which are very frequently used at the soda fountain and which are sometimes sold in the original containers, often contain sulphur dioxide compounds, resulting from the preliminary bleaching to which the cherries are subjected before dyeing them the bright red color. The national law permits the presence of sulphur dioxide if properly declared. The Pennsylvania state law prohibits it under all circumstances, except in dried fruits and molasses where the amount is limited. Such food products, therefore (other

than dried fruits and molasses in which limited quantities of sulphur dioxide are permitted when plainly declared), as are labelled to the effect that they contain sulphur dioxide, are illegal for sale or use in Pennsylvania.

Under the general food act also, would be included cake colored yellow with coal tar color, in imitation of eggs, or orange, or lemon, as the case might be; cake being frequently served at the soda counters of some of the larger stores. Under the general food act, also, would come instances of adulteration of confectionery. Adulteration in this connection need not take the form of the addition of harmful substances. The sale, for chocolate candy, of a confection containing other fats, such as cocoanut fat, which is commonly used to keep the confectionery from softening in hot weather and to cheapen it as well, is a violation of this law which is frequently detected and punished.

The sale, for licorice candy, of a product containing a minimum of licorice or none at all, but flavored with aniseed and colored with carbon black, is another example of a frequent violation of the food law. That the manufacturers know this, is shown by the fact that such goods are never labeled nor billed as the pure article, and thus the guarantee is of no value to the seller. The minimum fine for violation of the food act is $60 and costs.

The milk and cream act, is one also which the pharmacist might easily violate, as he uses milk as an ingredient of the numerous and popular egg drinks. Milk, to be legal in Pennsylvania, must be whole milk, unskimmed and without the addition of water or any other substance, and containing not less than 3.25 percent of butter fat and 12 percent of milk solids. The use of skimmed milk, where milk is called for, is a distinct violation of the law punishable by a minimum fine of $25. Under this same act also comes cream, which to be legal must contain not less than 18 percent of butter fat.

When a customer asks for vanilla-cream soda-water, how often is cream used in its preparation? Yet the use of any other substance than full-strength cream, is a distinct violation of the law. The use of milk or of artificially thickened products or of evaporated milk under such circumstances is a violation in each instance, punishable with the infliction of the penalty mentioned above.

Another, and a separate act, prohibits the use of any preservatives or coloring matter whatsoever in milk or cream. The minimum penalty for this offense is $50. Thus, milk which had been skimmed and then thickened and colored or preserved, would be a violation of two separate and distinct acts, each carrying a separate penalty.

The non-alcoholic drinks act, is the next one which particularly concerns the pharmacist. In this act (which covers soda-water and all other similar beverages, either served by the glass or in bottles), a large number of preservatives are prohibited by name. Benzoic acid and benzoates are not in this list of prohibited preservatives and are the only preservatives in common use not specifically mentioned. Coal-tar colors are not prohibited under this act.

The strict interpretation of this act requires all beverages which are artificially colored and flavored, and which are not sold under distinctive names, to be declared as to their character. Thus, orangeade or lemonade, if artificially colored, must be declared as such, to the consumer. How this can be done with an un-

labeled drink sold by the glass and not drawn from any special kind of a cooling urn, upon which the lettering can be placed, is a problem. The use of placards hung up prominently or a notice accompanying the printed or stenciled list of beverages, such as frequently used, would seem to be the most efficacious method of accomplishing the result.

The penalty for violating the non-alcoholic drink act is also a minimum fine of $25, as under the milk and cream act.

The ice cream act is the next under which the pharmacist may be liable. Ice cream must not contain any preservatives, must be true to name and must contain not less than 8 percent of butter fat, except in fruit and nut flavors, where 6 percent is required. Artificial colors are not prohibited when not used to conceal inferiority. Eggs, gelatin or vegetable gums are permitted where not used in excessive amounts.

This act also carries a penalty of a minimum fine of $25.

The fruit-syrup act is one which is frequently violated because of ignorance of its existence. The non-alcoholic drinks act already referred to, was passed in 1909. The only other act even indirectly concerned with this subject, was the previous act of 1905, called the fruit syrup act. This act, which is short and specific, prohibits the same preservatives as were later prohibited in the non-alcoholic drinks act and in addition to this, prohibits the use of any coal-tar colors whatever. The use of coal-tar colors in the drinks themselves, was not prohibited by the later act, which, however, did not include the repeal of the former; so there now exists the anomalous condition that if a fruit syrup containing coal-tar color is sold as such it is a violation of the law, whether the presence of coal-tar color is declared or not, while if the same syrup be made up into a beverage and dispensed, it is perfectly legal if the presence of the artificial coloration is declared.

The anti-cigarette law of the legislative session of 1912-13 is of such recent origin and has been so prominently brought before the trade that it is not necessary to do more than refer to it.

The foregoing are the laws other than pharmacy laws which affect the retail pharmacist, and from the examples cited it will be evident to those who are familiar with trade conditions, that the reason why pharmacists have largely escaped punishment for violation of these laws, is because the activities of the food inspectors are kept so busy in other directions that they rarely take samples from drug stores, and not because violations do not exist. The best way to avoid danger of prosecution under these laws is to pay the same strict attention to their requirements that is paid to the requirements of the pharmacy laws, and then there will be no cause for fear.

PATRIOTISM.

Patriotism is a blind and an irrational impulse unless it is founded upon a knowledge of the blessings we are called to secure and the privileges we propose to defend.—*Robert Hall.*

Necrology

JAMES J. OTTINGER.

James Jeremiah Ottinger, of Philadelphia, died of pneumonia on Tuesday, May 19, 1914, as the result of a cold contracted while taking a motor ride.

Mr. Ottinger was sixty-five years old and was a widely known pharmacist. He graduated from the Philadelphia College of Pharmacy in 1868, and became an assistant to O. S. Hubbel, who for many years had a store on Chestnut Street, west of Broad.

For a time he was employed in the City of New York, but returned to Philadelphia to open a store at Twentieth and Spruce Streets, where he continued in business until his demise.

Mr. Ottinger became a member of the American Pharmaceutical Association in 1876, and of the Pennsylvania Pharmaceutical Association in 1899. He was a member, also, of the Alumni Association of the Philadelphia College of Pharmacy, the Navy League of the United States, the Young Republicans, and of the Philadelphia Country Club.

He is survived by a widow and daughter.

The funeral services were held on May 23, 1914, at his home. The Rev. Edward Yates Hill, pastor of the First Presbyterian Church, officiated. Interment was in Ivy Hill Cemetery, Germantown.

The honorary pall-bearers were Colonel J. Granville Leach, Professor Joseph P. Remington, Howard B. French, Earl D. Putnam, Drs. Charles S. Turnbull, Alfred Hand, Jr., Edward P. Davis, D. D. Smith, S. McClintock Hamill, Francis P. Packard and I. Minnis Hayes.

J. W. E.

MARIE BLAHNIK.

Mrs. Marie Blahnik passed away on Wednesday, April 22, 1914, at her home, 1225 South Harding Avenue, Chicago. Mrs. Blahnik was born in Christov, Bohemia. Some forty years ago she came to America, and, while always remaining true to Bohemia and to Bohemians, she was a most loyal American citizen, dearly loving her adopted country and all the activity and progress for which it stands. She was one of the oldest druggists, in years of service, in the city of Chicago. When women pharmacists were almost unknown, Mrs. Blahnik was successfully conducting a store of her own on West Eighteenth Street, which remained under her control until her death, although for some years past she had not taken an active part in its management.

She was a modest, womanly woman, "true as steel," kind, ever ready and anxious to lend "a helping hand." She had many friends among both the Bohemians and the Americans. "Those who knew her best, loved her best," could be said most truly of Mrs. Blahnik.

She was a member of the Illinois Ph. A., the A. Ph. A., the C. R. D. A., and N. A. R. D., and the Chicago Chapter of the W. O. N. A. R. D., and for years was Honorary President of the W. Ph. A., many times entertaining in her own true, hospitable manner its members in her home.

Her death was sudden, though as serene and peaceful as she had made her life. Her loss will be keenly felt, not only in her own home and among her own people, but throughout the community and by a very large circle of friends.

C. E. S.

SIR JOSEPH WILSON SWAN.

At the ripe old age of eighty-six years, Sir Joseph Wilson Swan has passed into his long rest. In his boyish days he showed a strong leaning to science, and was accordingly apprenticed to learn the "art and mystery of the Apothecary," or "Chemist," as it is more commonly termed in England. He was one of the pioneers to whom we owe the present perfection of the incandescent electric light, working in connection with the Brush Electric Light Company along that line of effort. Swan's filaments for his lamps were made by injecting a jet of collodion into a coagulating medium. This method was used for many years in the manufacture of these lamps and the manufacture of these filaments is said to have suggested to a French inventor the idea of the manufacture of artificial silk. He made many improvements in photographic processes and it is to him that we owe the invention of rapid dry plates and many other improvements in that field.

His honorable and successful career should stimulate every young pharmacist to effort, with the desire to emulate his service to the world. Nopoleon said, "Every soldier carries a marshal's baton in his knapsack." So every young man, taking up the study of Pharmacy, may become a leader of the race in any of the various professions to which the study of Pharmacy opens the way.

THOMAS LATHAM.

Proceedings of the Local Branches

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Acting Editor on the day following the meeting, if possible. Minutes should be *plainly* written, or typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter.

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SAN FRANCISCO.

The Branch Association met on Tuesday evening, June 9th. The minutes of the May meeting were read and approved. Dr. H. M. Simmons was elected to membership.

After the dispatch of the routine business, Dr. Schneider called the attention of the members to the article on the anti-dysenteric properties of Chaparro Amargosa, by Dr. P. I. Nixon, which recently appeared in the Journal of the American Medical Association. Specimens of the plant were shown.

Dr. John Zieg presented a paper on "Some points for the pharmacist regarding the products used in organ-therapy." The doctor confined his remarks to those biological products which are derived from the adrenal, thyroid, thymus, pituitary and ovarian glands, which he stated have a therapeutic value quite well established.

The Branch adjourned to meet again on July 14th. On this evening Mr. J. Lengfeld will comment on some National Formulary preparations, Elixir of Ammonium Valerianate, Solution of Aluminum Acetate and Camphor-Menthol.

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SAINT LOUIS.

The Saint Louis Branch held its last regular meeting for the season in the Saint Louis College of Pharmacy, on Friday evening, May 15. In the absence of the president and vice-presidents, Mr. Ilhardt presided and introduced Mr. W. W. Ohlweiler, general manager of the Missouri Botanical Garden, who gave an interesting talk on the subject, "Modern Herbal Garden."

Mr. Ohlweiler stated that there were growing at the garden between five hundred and six hundred medicinal plants divided into thirty-three groups, upon each of which its name was conspicuously displayed, and that the garden was kept particularly for the use of the pharmacists of the city and its vicinity.

He also outlined the course of school gardening which will begin this fall, in which an attempt will be made to teach the economic uses of plants from the standpoint of the botanist.

The following took part in the discussion which followed: Miss M. L. Sutter, Wm. K. Ilhardt, Dr. H. M. Whelpley, Prof. Francis Hemm, Julius C. Hoester, Prof. Leo Suppan, Chas. H. Bierman, Paul L. Goodale, Dr. Richard Kring, Gustav Kring, Carl T. Buehler, Franz Berg, Ferd Freeze and J. W. Mackelden.

On motion of Professor Hemm and seconded, a vote of thanks was extended to Mr. Ohlweiler for his discourse and the interest which he and the other members of the Missouri Botanical Garden are manifesting in our Association.

JULIUS C. HOESTER, Secretary.

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NORTHWESTERN BRANCH.

The April meeting of the Northwestern Branch of the American Pharmaceutical Association was held immediately after a special meeting of the Minnesota State Pharmaceutical Association at the Nicollet Hotel, Minneapolis, on April 15, 1914, at 8 p. m.

The following program was presented:—

1. Some Recent Problems of the Pharmacist—Mr. W. A. Frost.
2. Spices: Official and Unofficial Varieties—Mr. M. H. Haynes.
3. Some Tests on the Ethereal Tincture of Digitalis—Mr. F. A. U. Smith.
4. Should Students in Pharmacy take Military Drill?—Dean F. J. Wulling.

The meeting was preceded by a dinner at 6:30 o'clock.

The resignation of Chas. T. Heller as President was accepted with regret, and, upon nomination, A. D. Thompson, of Minneapolis, was unanimously elected to fill the vacancy. Mr. Truman Griffen was elected as Vice-President, the latter office having been made vacant by the promotion of Mr. Thompson.

Mr. Frost was the first speaker, and he confined his remarks chiefly to a consideration of samples of linseed oil that he had recently purchased, some of which were of such poor quality that it was impossible to make a soap from them. Mr. Frost stated that he was indebted to Mr. M. H. Haynes for the following analysis of one sample:

"The oil is probably manufactured by the so-called "New Process," which consists essentially of a carbon bisulphide or petroleum naphtha extraction and consequent recovery of the solvent by distillation. This process, seemingly, permits the extraction of considerable quantities of albuminous material, which, upon distillation of the solvent, is precipitated in the oil. In the case of this sample, the filtration process evidently was not perfect, for in addition to the albuminous matter, there is vegetable tissue present, which was demonstrated by diluting a sample of the oil with twenty parts of ether and centrifuging; the sediment thrown down being subsequently submitted to a microscopic examination. Alcoholic-saponification yields a value of 179, compared with the U. S. P. 187 to 195. The iodine absorption value is 151 in comparison with the U. S. P. of not less than 170. You will note that these results are low as compared with the U. S. P. figures. This, in my opinion, may be accounted for in a large degree in that the process of extraction removes the oil not only from the flax seeds, but also from all foreign seeds present which contain volatile and fixed oils. Commercial flax may contain up to 6 or 8 percent of foreign seed, and if such is present, the results above indicated may be anticipated, working by the new process. In the case of the old process of hot pressure, these foreign oils are not usually present. Will say that upon filtration, the sample in question yields a clean, normal-appearing oil, with the exception that the viscosity appears a little low."

Mr. F. A. U. Smith spoke upon "The Relative Value of Ether Extractive and Dilute Alcohol Extractive of Digitalis."

"In the PHARMACEUTICAL JOURNAL for February 7th, Thomas Stevenson referred to an article on Digitalis, by Louis Kolipinski, which appeared three weeks earlier in the Interstate Medical Journal.

Kolipinski concluded, from observed effects, that the regulated strength of the heart-muscle and the gastro-enteric irritation produced by digitalis, are the results of different principles, and that the principle which acts best on the heart is the least poisonous.

In the leaf of foxglove there is present an acid resin. This resin has always been regarded as inert.

Kolipinski proposes to name this resin, "Digitalic Acid." He regards it as the mother source of the various principles found in digitalis, and states that it is the least poisonous of digitalis-constituents and the best in its effect on the heart.

The purest form of "Digitalic Acid" is obtained by digesting the dried leaf with ether, although Kolipinski states that, for medicinal use, a sufficiently pure product may be obtained by digesting the dried leaf with sodium hydroxide and subsequently neutralizing with sulphuric acid. The product, "sodium digitalate," occurs as deep-green, non-crystalline lamellæ of considerable lustre, soluble in water, with formation of a greenish-blue solution. When prepared from the precipitated resin, it occurs as a brownish-colored powder, which forms a greenish-brown solution with water.

Kolipinski states, that experiments upon guinea pigs showed that, in large doses, sodium digitalate arrests the left ventricle in bloodless systole. Chemical results, he states, show that it gives uniformly all the good results of digitalis, without its toxic effects, and that it can be given hypodermically, without producing local inflammation or irritation. He recommends a single daily injection of 1/33 grain (0-0022 gm.). In urgent cases, the dose may be repeated later in the day, until the severity of the symptoms is mitigated.

After reading this account of Kolipinski's work, I began immediately to prepare some of the substance which he terms "Sodium Digitalate," because I realized that such a preparation would be of great medicinal value if Kolipinski's assertions were correct.

Allen's digitalis leaf was taken, exhausted with ether, the ethereal extract dried by spontaneous evaporation and the residue dissolved in a minimum of sodium hydroxide solution. The strength was adjusted by the addition of water so that the finished solution contains the ether extraction of 10 gms. of dried digitalis leaf in 100 cc., (same strength as the U. S. P. twelve). A specimen of this liquid is here shown and you will notice that the color is green with a brownish tinge.

A sample of the ether-exhausted powdered

leaf is also shown, together with a tincture made from 10 gms. of the ether-exhausted leaf of the strength of the U. S. P. tincture. Owing to the claims of my business, I have not been able to compare the physiological strengths of these preparations until to-night, when I hope to be able to show you how such experiments are performed.

In the interval since these preparations were made, there has appeared in the PHARMACEUTICAL JOURNAL, for March 14th, an article by Gordon Sharp, of Edinburgh, a noted physiologist, entitled "Digitalic Acid (Acid Resin) the Active Principle of the Digitalis Plant." Dr. Sharp had prepared preparations similar to those I have described. He tested the products on frogs and found that the solution of digitalic acid caused no stopping or slowing of the heart, in fact showed no action at all, whereas, the tincture prepared from the ether-exhausted leaf, stopped the heart within four hours, except in one frog, in which the beat was slowed to 3 to 5 a minute. Dr. Sharp intends to try the chemical action of these preparations, bearing in mind that pharmacological experiment is not always confirmed by the therapeutical effect. Until this has been done all that Dr. Sharp can say is, that pharmacological experiment fails to find evidence of toxicity or activity in the acid resin or so-called "Digitalic Acid" of Kolipinski.

Let us now try the effect of the solutions I have prepared, on some frogs and guinea pigs and find out for ourselves whether the ether extracts the valuable properties of the drug. Incidentally, you may be interested in seeing how this work is carried out. As you know, it is necessary to use a number of animals before it is possible to standardize a preparation with exactness. This is due to many causes, including the age, weight and sex of the animals, and so forth. Take the case of frogs. At this time they are waking up from the period of hibernation and they may or may not have quite reached a condition of normal physical activity.

The results confirm the report published by Dr. Gordon Sharp, in that the "Digitalic Acid" preparation appears to produce no effect whatever, while the preparation made from the marc, gives the typical action and toxicity of good digitalis."

Owing to the lateness of the evening, Mr. Haynes deferred reading his paper on spices and spoke briefly on the subject of the adulteration of Santonica. He stated that several samples had recently come to his attention which contained no true Santonica, probably due to the scarcity and consequent high price of the genuine, another article having been substituted entirely. The false article resembles very closely Santonica and is probably from a closely related species of Artemisia. A microscopic examination shows the false flower-heads to be a little smaller, greener, and more stemmy than Santonica. The odor and taste are seemingly identical with the true drug. Upon examination with the microscope the false sample shows distinctive and apparent differences from Santonica. A chemical examination of the spurious article yields little or no santonin, the largest amount obtained being but one-fourth of one percent.

Samples of Santonica and the adulterant, were exhibited in which the members were greatly interested.

EDWIN L. NEWCOMB,
Secretary N. W. Branch A. Ph. A.

On Monday evening, April 27th, Prof. E. L. Newcomb, the Secretary of the Northwestern Branch, gave a lecture before the Ramsey County Medical Association on crude drugs, their production and valuation. He pointed out the many difficulties encountered in collecting or growing medicinal plants of good quality and warned his hearers that the cultivation of medicinal plants was not the bonanza that the lay press had represented. Plant enemies, bad seasons, lack of experience in sowing and harvesting and other causes militated against the grower of herbs in his efforts to produce good drugs.

A fine collection of growing plants and dried drugs was shown, the latter illustrating the great need for the exercise of care in a druggist's purchases, by contrasting good and bad specimens of important drugs, such as: Belladonna Folia, Digitalis, Stramonium, Rheum, Aconitum, Gentian, and others.

Dr. Newcomb described the work of the students at the School of Pharmacy of the University of Minnesota, especially in the growing of medicinal plants and the harvesting of them in proper condition for the laboratory or dispensing counter.

The Chairman, Dr. Ritchie, invited a discussion on Dr. Newcomb's paper, in which several physicians and druggists joined, including Drs. Savage, Renz and Gilfillan, and Messrs. Rietzke and Frost.

Dr. Savage thought that the physiological standardization of vegetable drugs was of vital importance, especially when the effect of the drug was alike on the lower animals and man.

Dr. Renz spoke of the importance of having prescriptions filled by pharmacists who were well informed and capable of supplying medicines in the best possible condition.

Dr. Gilfillan congratulated the speaker on his admirable discourse, and expressed the hope that this evening would not be the last one devoted to so important a subject. He wondered how many druggists took the pains to keep such drugs as digitalis in good condition, free from moisture, and other deteriorating influences.

Mr. Frost replied that druggists were very much alive to the importance of buying good drugs and storing them properly.

Mr. Rietzke expressed his pleasure in being present at this "get together" meeting of St. Paul physicians and pharmacists.

After adjournment of the meeting refreshments were served.

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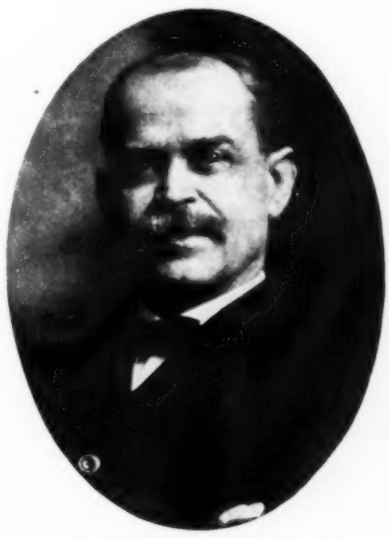
COLUMBUS.

The first steps in the formation of a local Branch, in Columbus, were taken at a meeting of a number of the prominent pharmacists of this vicinity, including those from the Government Post, in response to an invitation from the Acting Editor of the JOURNAL to meet him at lunch at the Chittenden Hotel on May 27.

This invitation was heartily responded to, and the feeling was evinced that the formation of a Branch in Columbus, the home of the JOURNAL, had been too long deferred; that immediate action should be taken to form a local organization and that efforts should be made to secure the adhesion of a sufficient membership. The meeting adjourned to be called together at a later date.

On the evening of June 5, the druggists of the vicinage were the guests of Professor George B. Kauffman, in the Dutch room of the Hotel Chittenden. After the serving of a bountiful repast, Mr. Marshall called the meeting to order and stated the object of the gathering. He then called for the nomination of a temporary chairman, and Professor Kauffman was elected to that position, Mr. Edward Spease being selected as Secretary *pro-tempore*.

Mr. Kauffman accepted the duties of temporary presiding officer in a ringing speech, stimulating to the loyalty of the members of the A. Ph. A. and also to their fealty to the city of Columbus. It was time he said "to get out and get under" this movement. The journal of the Association, the leading pharmaceutical organ of the country, was edited, printed and published in this city, and every druggist and every citizen in Columbus should be proud that this fact made their city the center of pharmaceutical light for this country, if not for the entire world. Ambition and duty alike, called for them to make earnest effort to show their appreciation of the honor now conferred upon their home-city and to endeavor in every way to retain that



PROF. GEORGE B. KAUFFMAN

honor. During his remarks he paid a gracious tribute to C. Lewis Diehl, "the father of American Pharmacy." He said that he was in communication with the Chamber of Commerce of the city in regard to the retention by it of the proud position it now enjoyed, relevant to American Pharmacy.

Mr. Marshall called attention to the work of Dr. Beal in establishing the JOURNAL upon a firm foundation and to its extensive circulation. By means of it, Columbus was known to every civilized country on the globe, as the JOURNAL is on file in the great libraries of the capitals of Europe, and its pages were scanned from Syria to Canton, China. As was once said of England's banner, "the sun never set

upon it," so it might be as well said that the sun was ever shining upon the open leaves of the JOURNAL!

Mr. Topping moved that a Branch be formed, and it was so ordered. A committee was appointed to present the petition to the Honorable Council of the Association, praying for permission to establish a Branch in this vicinity.

A tentative organization was effected by the choice of Mr. George B. Topping, Ph.C., President; Edwin N. Webb, Vice President; Edward Spease, Ph.C., Secretary; Ernest C. Marshall, Ph.G., Treasurer, and Professor George B. Kauffman as Council Representative. The petition for the formation of the Branch has been brought before the Council and appears in .he Council letters of this issue.

It is hoped that this organization will unite all the druggists of Columbus and its vicinity into one strong organization to work for the mutual good of the profession in the district comprised within its zone of influence.

College and Society

THE N. A. R. D. CONVENTION.

The annual meeting of the National Retail Druggists' Association in Philadelphia, the week of August 17th, promises to be a most interesting one in the way of entertainment for all those who attend the Convention.

The entertainment program comprises the following special features: The Officers' Reception and Grand Ball, which will take place in the magnificent ball-room at the Bellevue-Stratford Hotel on Monday evening, August 17th; an automobile sight-seeing tour is scheduled for the ladies on Tuesday, and on Wednesday, they will be the guests at a reception to be held at the John Wanamaker's store. Thursday will be "Scottissue Day," when the delegates will be taken on a steamer-excursion, by way of the Delaware river, to the model paper-plant of the Scott Paper Company, and on the return of the delegates, a stop will be made at the League Island Navy Yard for its inspection. Friday will be "Wampole Day," and the Convention will be the guests of Henry M. Wampole & Co. at Willow Grove Park. An elaborate dinner will here be served to all members. There is no prospect of any visitor to the Convention being afflicted with ennui or nostalgia during the gathering, for the Committee has left no moment disengaged in the program they have planned. In connection with the meeting the exhibits at the Convention will be of much interest and attraction.

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PACIFIC COAST.

The regular monthly meeting of the Women's Pharmaceutical Association of the Pacific Coast was held May 22, 1914, in the Assembly Hall, Pacific Building, San Francisco. Mrs. R. E. White was in the chair.

A large attendance was present. Discussions were held on "A Method of Preparing Solution for Testing Purity of Nitrous Oxide Gas;" "A New Method of Filling Santal Oil Capsules;" "Improved Blaud's Pills," and "Prescription Pricing."

The President appointed the following delegates to the Annual Convention of the California Pharmaceutical Association: Miss Della Crain, Santa Cruz; Mrs. E. Goodman, San Francisco, and Mrs. E. E. Patterson, San Jose.

Mrs. Philip read a paper entitled "A Clerk." The discussion of the evening was on "Laboratory Methods."

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COMMENCEMENT OF THE COLLEGE OF PHARMACY OF THE UNIVERSITY OF THE STATE OF NEW JERSEY.

The Commencement of the Department of Pharmacy of the Un.versity of the State of New Jersey, for the classes of 1913-14, took place at the Masonic Temple in Jersey City, on the evening of June 2d, President Hon. James E. Pope presiding. The invocation was delivered by the Rev. Harry L. Everett, the Chaplain of the University, and the address on behalf of the University was given by Joseph E. Bernstein, the Treasurer.

The principal address of the occasion was made by Geo. M. Beringer, of Camden, N. J., the President of the A. Ph. A. In his usual genial manner, President Beringer gave some of the history of pharmacy and advised the young graduates to be proud of their profession and to follow the example which has been given them by their teachers. He urged them to become members of the A. Ph. A.

and thereby to benefit themselves as well as to lend a helping hand in the evolution of pharmacy.

Hon. William H. Speer, Judge of the Hudson County Circuit Court, then delivered a short address. Dr. Joseph Koppel, Dean of the Department of Pharmacy, spoke on the great many improvements which have been made in the buildings and the equipment of the College, and also in the reorganization of the Faculty. He conferred the Degree of Graduate in Pharmacy (Ph.G.) on seventeen (17) students, and the Degree of Doctor of Pharmacy (Phar. D.) on thirty-two (32) students, the latter being dignified with the Doctor's hood.

President James E. Pope awarded the following prizes: The gold medal to Joseph S. Churgin, the silver medal and the silver cup for the best examination in Organic Chemistry to Herman H. North, both of the Senior Class, and the bronze medal to Jacob Feinberg of the Junior Class. The Post-Graduate prizes consisted of three (3) memberships in the A. Ph. A., and were awarded by Prof. Otto Raubenheimer to the following students: Isaac Friedman, for the best thesis in Chemistry, namely, "Arsenic in Household Articles;" Eugene Gordon, for the best thesis in Physiological Chemistry, namely, "Seminal Fluid," and Isidor A. Saphiro for the best thesis in Pharmacy, "Phenol and a Few of Its Derivatives."

Prof. Luke C. Hines, Secretary of the Faculty, read the Honor Roll of the Post-Graduates and Seniors. Herman H. North, in an elegant manner, delivered the valedictory address of the Senior Class, and Meyer A. Feinberg delivered an excellent address in behalf of the Post-Graduate Class.

The musical and vocal talent was supplied by the Malkin Music School of New York, and was highly appreciated. After the exercises, refreshments were served and the large audience was well pleased with the Commencement.

May 18th was a gala day at the College of Pharmacy of this institution when Prof. Joseph P. Remington addressed the students on "The Graduate's Opportunity." This address was given to the graduating classes, the members of which, undoubtedly, will profit by the good advice given by the professor. The speaker made the recommendation that pharmacists and physicians should go hand-in-hand for the mutual protection of the public. He advocated the practice of more professional pharmacy and less of commercialism.

Prof. Remington's lecture was highly appreciated by all his auditors and especially by the students, who greeted him with cheers and college cries which were specially prepared for the occasion.

Dr. Joseph Koppe, Dean of the College, announced at the same time the names of those students who successfully passed the examinations.

The College year has been a very successful one, inasmuch as the Post-Graduate class consisted of fifty (50) students, and the Senior class twenty-five (25).

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LOUISVILLE COLLEGE OF PHARMACY.

On Tuesday, May 12th, this institution completed its forty-fifth year with Graduation Exercises at the Woman's Club. Diplomas were awarded to twenty-nine young pharmacists, the degrees being conferred by President Simon N. Jones.

The College Medal was awarded to Sterling T. Monroe for best general average, and the Voigt & Co. Medal to S. Elbert Nichols for second honors.

The Peter-Feat-Richardson Medal was awarded to Wm. Orville Patterson for best general average in the Junior Class.

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ILLINOIS PHARMACEUTICAL ASSOCIATION.

With the slogan of "A week-end at Fox Lake" as a rallying cry, the Illinois Pharmaceutical Association assembled at the meeting of their State Association, June 11th, 12th and 13th, and had a very successful convention. For the first time in many years the Association had selected a summer resort for the place of meeting, and that the experiment was a success was the expression of practically all of the three hundred or more druggists and traveling-men who attended the convention.

The usual opening addresses were dispensed with. The Association listened to an excellent address by President Ralph R. Dorland, which, as well as the skillful manner in which he handled the convention, was widely commented upon. He especially urged druggists to get into politics, to make themselves felt as a political factor, to the end that the in-

terests of pharmacy might be conserved in both state and national legislation. He urged the formation of local organizations, and the cordial support of the two great national associations—the A. Ph. A. and the N. A. R. D. He thanked the members for their generous assistance to the officers in carrying on the Association's work during the past year and made a strong plea for a wider co-operation among pharmacists, especially in view of the need for anti-narcotic legislation and the powerful opposition that had developed. He urged that the Illinois Pharmaceutical Association be made an all-year-round organization and that its activities be not limited to the few days of the annual convention and the semi-annual session of the Executive Committee. He recommended the maintenance of permanent headquarters and the employment of an organizer to recruit the membership and interest the druggists in the work of the Association. President Dorland's address was received with applause and was referred to a committee consisting of W. S. Denton, O. C. Nusele and James H. Wells.

The report of the Secretary, W. B. Day, concluded with the presentation of 133 new members who were elected. This is the largest accession of members in many years.

Treasurer Garver's report showed an income for the year of $1765.68 and expenditures of $1914.39. There was $600.00 in the permanent fund and $1260.63 in the general fund at the close of the fiscal year, May 31, 1914.

Chairman Byron Armstrong of the Committee on Trade Interests, presented an excellent report and strongly endorsed legislation aimed at the establishment of a system of one-price to all on trade-marked and branded goods.

Chairman Charles Brunstrom presented the report of the Legislative Committee, which was devoted chiefly to plans for the coming year when the Legislature will again be in session.

Secretary Potts of the N. A. R. D. made a stirring address and offered resolutions regarding the unfair practice of cutting prices on standard goods, commending the Stevens Bill and pledging the earnest support of this Association. These resolutions were unanimously adopted.

Other reports were made as follows: For the Committee on Propaganda, Lee M. Pedigo, Chairman; for the Committee on Druggists' Home, George W. Sohrbeck, Chairman.

Resolutions were adopted endorsing the National Association of Retail Druggists and continuing affiliation with that Association, also resolutions commending the U. S. Pharmacal Company.

Awards of prizes for essays were made as follows: First prize, J. A. Mahaffy, "The Advertising Value of Your Window"; second prize, to H. N. Bruun, "Advertising Schemes."

The following nominees were selected for presentation to the Governor for his consideration in appointing a member to fill the next vacancy on the Board of Pharmacy: J. B Michels, El Paso; Robert Clarkson, Springfield; Lee M. Pedigo, Chicago. To the President of the University of Illinois for appointment of a member of the Advisory Board to fill the next vacancy, the following were selected: Jos. F. Shreve, Jacksonville; J. C. Wheatcroft, Grayville; Joseph Hottinger, Chicago.

Officers for the ensuing year were elected as follows: President, W. F. Baum, Danville; Vice-Presidents, Julius Riemenschneider, Chicago; W. S. Denton, Beardstown; Byron Armstrong, Jacksonville; Secretary, W. B. Day, Chicago; Treasurer, Christian Garver, Bloomington.

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UNIVERSITY OF ILLINOIS SCHOOL OF PHARMACY.

The new catalog of the University of Illinois School of Pharmacy is now ready for distribution. A copy may be had by addressing the Actuary, W. B. Day, 74 E. 12th Street, Chicago.

Announcement is made of an increase in the entrance requirements beginning with the session of 1916-17 to graduation from high school of accredited grade or the full educational equivalent of this. The present entrance requirements for the shorter course which leads to the degree of Graduate in Pharmacy are two years of high school of accredited grade or its full educational equivalent.

For entrance to the longer course, leading to the degree of Pharmaceutical Chemist, graduation from high school is already required.

Entrance examinations, conducted by the Registrar of the University, will be held at the College of Medicine, Congress and Ho-

nore Streets, Chicago, September 21st to 25th, and will include all the high school branches in which credits are accepted.

Mr. Andrew Scherer, an alumnus of the Class of 1875, has offered a prize of twenty-five dollars in gold to the senior student who attains the highest average in pharmacy.

The fifty-fifth session begins Tuesday, September 22d.

The longer course in the school of pharmacy, leading to the degree of Pharmaceutical Chemist, closed June 5th; the degree was conferred upon Paul Wright Edgett, Gennaro Dominic Lavieri, Albert Schreiner, Jr., George Stulik, George F. Vaupell and Edgar Philip Heidbreder.

The Advisory Board held its annual meeting at the School June 4th. There were present at the meeting, George O. Lescher, of Galesburg; A. G. C. Ackermann and Herman Fry, of Chicago, as well as the faculty of the School.

The Chicago Veteran Druggists' Association has presented to the School the silver loving cup which was presented to Albert E. Ebert in 1995 and which, upon his death, reverted to the C. V. D. A.

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MASSACHUSETTS STATE PHARMACEUTICAL ASSOCIATION.

At the annual meeting of this Association held in June, the following officers were elected: Frank J. Campbell, President; John T. Harper, Great Barrington, William Hardie, Fall River, P. J. Fitzpatrick, Wellesley, Vice Presidents; James F. Guerin, Worcester, Secretary; James F. Finneran, Boston, Treasurer; William F. Sawyer, Boston, Edward A. Mole, Adams, James W. Cooper, Plymouth, Trustees of the Permanent Fund; Elie H. La Pierre, Cambridge, Delegate to the State Board of Trade.

Messrs. John J. Tobin, John F. Hayes and George J. Carroll were nominated for the Board of Pharmacy, and Prof. Charles F. Nixon, W. S. Flint and E. F. Leonard were nominated for the Board of Health.

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The following telegram was received at the Scio office on June 17:

SANTA CRUZ, CALIFORNIA.

American Pharmaceutical Association, Scio, Ohio:

The California Pharmaceutical Convention, in annual convention assembled, extends to the American Pharmaceutical Association our greetings and good-fellowship, and ask you to make San Francisco your convention city for nineteen-fifteen. We hope to have delegates at your nineteen-fourteen convention to present our claims. Yours fraternally,

CALIFORNIA PHARMACEUTICAL ASSOCIATION.
K. B. BOWERMAN, Secretary.

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OHIO STATE UNIVERSITY.

COLLEGE OF PHARMACY.

Commencement exercises were held in the Gymnasium on Wednesday, June 17, 1914. Six candidates for the degree of Bachelor of Science and 16 candidates for Certificate of Pharmaceutical Chemist were presented to the President by Dean George B. Kauffman.

The College of Pharmacy being an integral part of the University, its graduates participate in the general exercises of Commencement with the graduates of the other schools and stand in the same relation to the University as do all other of its graduates. The following are those who received the degree of Bachelor of Science in Pharmacy, with the titles of their theses:

Otto Carl Blum, Portsmouth, thesis, "Methods for Detecting Ethyl and Methyl Alcohol"; John Clinton Bowman, Thornville, thesis, "Outline for the Analysis of Sugar"; Robert Bruce McCann, Columbus, thesis, "Rapid Methods for the Separation of Alkaloids"; Earl Aloysius May, Van Wert, thesis, "Lead Acetate in the Examination of Gum Resins"; Albert Reinhart Paar, Canton, thesis, "Tests for the Identification of Cocaine and its Substitutes"; Paul C. Slater, Mechanicsburg, thesis, "The Estimation of Small Quantities of Alkaloids in Medicinal Preparations."

Sixteen candidates were awarded certificates as Pharmaceutical Chemists.

Editorial Notes and Announcements

JAMES H. BEAL, Editor.....Scio, Ohio
ERNEST C. MARSHALL, Acting Editor,
63 Clinton Building, Columbus, Ohio

The Association does not accept responsibility for the opinions of contributors. Offensive personalities must be avoided.

Under the rules of the Postoffice the JOURNAL can be regularly mailed only to bona-fide paid subscribers. Subscriptions and association dues should be sent to the Treasurer, H. M. Whelpley, 2342 Albion Place, St. Louis, Mo.

All communications for insertion in the JOURNAL, or respecting advertising, requests

for back numbers, and claims for missing numbers should be sent to the Acting Editor, 63 Clinton Building, Columbus, Ohio.

Claims for missing numbers will not be allowed if sufficient notice has not been given of change of address, and in no case if received later than sixty days from the date of issue.

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A. PH. A. PRIZE MEMBERSHIPS.

The following gentlemen have been awarded nominations to membership in the A. Ph. A. from colleges and universities because of exceptional work:

St. Louis College of Pharmacy—Julius Blanton Linn, of Canton, Mo., for general scholarship.

Baylor University, School of Pharmacy—John Morgan Fletcher, Dallas, Texas, for best general average.

University of Oklahoma—Frank Bradley, of Noble, was awarded the Browne prize, and Ralph Hron, of Guthrie, and Clarence Nicholas, of Anadarko, the Barbour prizes.

University of Tennessee—John H. Grant, Jacksboro, The Fortune-Ward Drug Co., of Memphis prize, for highest grade in Chemistry.

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PERSONAL MENTION.

Mr. Harry S. Noel, member of the advertising staff of Eli Lilly & Company, was married June 10th, to Miss Nellie K. Covert, of Indianapolis, at SS. Peter and Paul Cathedral, by the Rt. Rev. Bishop Chartrand. Mr. and Mrs. Noel are taking an extended wedding trip East and will visit Mr. Noel's parents at Williamstown, Mass. New York City, Albany, Ithaca and perhaps several other cities will be included in their itinerary. Mr. Noel is a graduate of the Albany College of Pharmacy and for two years was connected with the Druggists' Circular and is known to many readers of the drug journals as he has been a contributor to the journals from time to time for the past five or six years.

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Maurice Palais Schwartz, the Secretary of the Indiana Pharmaceutical Association, was united in marriage to Estella Cecilia Fox, daughter of Mrs. Isabella R. Fox, on Tuesday, the 26th of May last, at Indianapolis.

Council Business

COUNCIL LETTER No. 23.

PHILADELPHIA, May 26, 1914.

To the Members of the Council:

The following communication has been received from Harry B. Mason:

"I am just in receipt of the proposed programme for the 62d annual meeting—page 55 of Council Minutes. I want to protest against the way in which the two sessions of the Commercial Section have been separated by three days. I have been chairman of different sections on three or four occasions, and I have discovered that the minute you sacrifice continuity you sacrifice interest also. I was shoved in as chairman of the Commercial Section this year somewhat against my wishes, and since my appointment I have been endeavoring to get up a live, vital, interesting programme. I want, if possible, to make the Commercial Section a real asset and to this end I plead for a fair hearing.

All of which is preliminary to this motion: that the second session of the Commercial Section be held on Wednesday morning at 9:30 instead of Friday morning at 9:30, and that the first session of the Section on Pharmacopœias and Formularies be changed from Wednesday morning to Wednesday afternoon."

Motion No. 36 (Amendment of Program for Sixty-second Annual Meeting). Moved by H. B. Mason, seconded by J. W. England (1) that the second session of the Commercial Section be held on Wednesday, August 26, at 9:30 a. m., instead of Friday, August 28, at 9.30 a. m., (2) that the second session of the Conference of Pharmaceutical Faculties be held on Wednesday, August 26, at 10 a. m., and (3) that the original program as amended by above be substituted for the program given under Motion No. 35.

E. Fullerton Cook, Chairman of the Section on Pharmacopœias and Formularies, is opposed to any change in time for the first session of his Section, and if there is no objection, the time allotted for this Section will not be changed.

The following letter has been received from A. H. Clark:

"I return an affirmative vote on the proposed program for the Detroit meeting. I sincerely hope that this program will be strictly adhered to, as I believe it is a long step in the right direction. I hope also that all the changes suggested by Mr. Mason in Council Letter No. 20 will be adopted, as I

am firmly convinced that such changes will lead to much improvement over the present proposed program for the Detroit meeting. With few exceptions, the proposed changes are so obviously, to me, the proper thing that argument seems unnecessary.

"There is one point I want to mention. No matter what the program is, how it is managed by the Council, whether it be short or long, whether there be conflicting sessions or not, there is one thing that soon or late must be done. That is this: Arrange your program before the meeting, publish it, *and then stick to it* at the meeting. What demoralizes the entire meeting, creating more confusion and dissatisfaction than all else put together, is the endless string of *changes* announced by the Local Secretary at the opening of every session. About the second afternoon of the meeting no one knows what the program is. This is the thing that must be done. The other things are really of minor importance."

The following communication has been received from Francis E. Stewart:

"In response to Letter No. 20, I am commenting upon some of the suggestions made by Harry B. Mason in his letter to the Council.

"Mr. Mason's suggestions on the whole are certainly excellent, but it would seem to me that possibly suggestion No. 5 should be modified in some way, that the Association may have the advantage of discussing important suggestions made in the reports of the committees. Suppose, for example, a committee on legislation or some other important subject makes a report which should be submitted to the general meeting for discussion and action: the suggestion No. 5 made by Mr. Mason does not provide in any way for bringing such reports before the house. The suggestion of the Committee might be of the greatest importance as relating to legislation pending in Congress, affecting in a vital manner the interests of the American Pharmaceutical Association, or of the pharmaceutical profession itself. The Committee making the report might have a very different opinion of the subject than the majority of the Association. I can even imagine a condition in which the Council itself might have a different opinion than the Association. How could such a subject be brought before the general meeting for discussion?

"In regard to Mr. Mason's suggestion No. 15, the Association would be perfectly safe to empower the general secretary to reject or reassign contributions as long as the present incumbent is retained in the secretary's chair, but it might be a very different matter if the secretary was a man of less judicial temperament and possibly biased for or against certain subjects that might be presented in papers for discussion by the Association. It would seem to me that no one person should have the power to reject a paper. This power should be vested in a committee very carefully selected by the Association, or the authority should be vested in the Council."

The following has been received from Lucius E. Sayre:

"Permit me to say I am in favor of the general principles suggested by H. B. Mason for injecting efficiency into the A. Ph. A., now needed to catch up with the modern ideas of effective and productive work.

"I should be sorry, however, to see the Section on Pharmacopœia and Formularies discontinued. Even the Materia Medica and Pharmacognosy should be *tried out.*

"I am surprised that Mr. Mason did not suggest the discontinuance of the Historical Section, instead of the others mentioned. This section, while indeed very important, does not, to my mind, have the same element of productivity and efficiency in it as do the sections recommended to be dropped.

"I should be glad to have the Council consider seriously the recommendation of Mr. Mason and I, for one, would be glad to sacrifice some of my pet sections for the general good."

Motion No. 37 (*Applications for Membership*). You are requested to vote on the following applications for membership:

No. 161. Edgar Seiple LaWall, 626 Second St., Catasauqua, Pa., rec. by Charles H. LaWall and M. R. LaWall.

No. 162. Joseph Hugh Cooney, 499 Columbus Ave., Boston, Mass., rec. by John G. Godding and Theodore J. Bradley.

No. 163. William Maurice Lange, 57 Dove St., Albany, N. Y., rec. by Warren L. Bradt and J. W. England.

No. 164. James Herbert Wood, 20 Broad St., Bloomfield, N. J., rec. by Garrett Byrnes and David Strauss.

No. 165. Emil Hermann Trumpold, 1108 Adams St., Dorchester, Mass., rec. by Elie H. LaPierre and Theodore J. Bradley.

No. 166. Charles Patrick Norton, 66 State St., Gt. Barrington, Mass., rec. by Theodore J. Bradley and C. H. Packard.

No. 167. Herman Jacob Epstein, 7 Page St., Boston, Mass., rec. by C. Herbert Packard and Theodore J. Bradley.

No. 168. Robert Edson Bemis, 7 Concord Square, Boston, Mass., rec. by C. Herbert Packard and Theodore J. Bradley.

No. 169. Floris Nagelvoort, 231 Van Dyke Ave., Detroit, Mich., rec. by W. Ohliger and H. M. Avery.

No. 170. D. Edmund Perrin, Fourteenth and Warren Ave., W., Detroit, Mich., rec. by Wm. A. Hall and Leonard A. Seltzer.

No. 171. Mrs. M. E. Pinkerton, 179 National Ave., Detroit, Mich., rec. by Geo. W. Crane and Wm. A. Hall.

No. 172. Ernest Kimmich, care Parke, Davis & Co., Detroit, Mich., rec. by Leonard A. Seltzer and Wm. A. Hall.

No. 173. Walter J. Turnbull, 1173 Hamilton Blvd., Detroit, Mich., rec. by Nathaniel H. Jones and Wm. A. Hall.

No. 174. Wirt P. Doty, 1913 Woodward Ave., Detroit, Mich., rec. by Nathaniel H. Jones and Wm. A. Hall.

No. 175. George M. Schettler, 55 West Fort St., Detroit, Mich., rec. by Leonard A. Seltzer and Wm. A. Hall.

No. 176. Roy E. Bodimer, 381 Clay Ave., Detroit, Mich., rec. by Nathaniel H. Jones and Wm. A. Hall.

No. 177. John A. Greer, 898 Michigan Ave., Detroit, Mich., rec. by Geo. W. Crane and Wm. A. Hall.

No. 178. Joseph Altman, 919 Intervale Ave., New York, N. Y., rec. by Otto Raubenheimer and J. Leon Lascoff.

No. 179. Adolf Shnitter, 1424 Washington Ave., Bronx, New York, N. Y., rec. by Otto Raubenheimer and J. Leon Lascoff.

No. 180. Frederich F. Alt, 208 East 84th St., New York, N. Y., rec. by Otto Raubenheimer and J. Leon Lascoff.

No. 181. Joseph S. Churgin, 210th St. and Gun Hill Road, New York, N. Y., rec. by Otto Raubenheimer and J. Leon Lascoff.

No. 182. Herman Harold North, 164 Grant Ave., Jersey City, N. J., rec. by Otto Raubenheimer and J. Leon Lascoff.

No. 183. John Edward Stacey, Summer St., East Saugus, Mass., rec. by Theodore J. Bradley and John Godding.

No. 184. Cyrus L. Schlobach, 437 Northampton St., Easton, Pa., rec. by Paul B. Anspach and C. H. Packard.

No. 185. Arthur L. Pillsbury, 1401 Lawrence St., Denver, Col., rec. by F. W. Nitardy and Emmett Powers.

No. 186. J. Atlee Dean, 1809 Wallace St., Philadelphia, Pa., rec. by Charles H. LaWall and A. J. Standt.

No. 187. Everett I. Frasier, 577 Antoine St., Detroit, Mich., rec. by Oliver H. Grunow and Wm. A. Hall.

No. 188. James H. Joyce, 1023 Third Ave., Detroit, Mich., rec. by R. W. Rennie and C. A. Weaver.

No. 189. Frederick J. Henning, 697 Third Ave., Detroit, Mich., rec. by R. W. Rennie and C. A. Weaver.

No. 190. Mathew H. Douglas, 488 Lincoln St., Detroit, Mich., rec. by R. W. Rennie and C. A. Weaver.

No. 191. C. H. Potts, 561 Trumbull Ave., Detroit, Mich., rec. by R. W. Rennie and C. A. Weaver.

No. 192. Oliver H. Greenow, 93 Gratiot Ave., Detroit, Mich., rec. by Wm. A. Hall and L. A. Seltzer.

No. 193. Alfred Price Breitenbach, 199 Gratiot Ave., Detroit, Mich., rec. by Wm. A. Hall and L. A. Seltzer.

No. 194. Alexander Reid, 87 Henry St., Detroit, Mich., rec. by Wm. A. Hall and L. A. Seltzer.

No. 195. Robert W. Rennie, 771 Third Ave., Detroit, Mich., rec. by Wm. A. Hall and L. A. Seltzer.

No. 196. E. C. Kinsel, 24 and 26 Michigan Ave., Detroit, Mich., rec. by Wm. A. Hall and L. A. Seltzer.

J. W. ENGLAND,
Secretary of the Council.

415 North Thirty-third Street.

COUNCIL LETTER No. 24.

PHILADELPHIA, PA., May 30, 1914.

To the Members of the Council:

The following communication was received from Local Secretary Seltzer with reference to program for sixty-second annual meeting of the American Pharmaceutical Association, after the issuance of Council Letter No. 23 (May 28, 1914), containing amendments by H. B. Mason and J. A. Koch to program:

DETROIT, MICH., May 28, 1914.

Mr. J. W. England, Secretary of the Council, Philadelphia, Pa.:

DEAR SIR—At a meeting of the local committee called for the purpose of considering the program submitted in Council Letter No. 22, it was deemed advisable to suggest a few changes. As modified, the program would read as follows:

Monday:

9.00 A.M.	Meeting of Council.
3.00 P.M.	First General Session. Meeting of Committee on Nomination.
7.30 P.M.	House of Delegates.
8.30 P.M.	Joint Reception of Presidents of A. Ph. A. and M. S. P. A., followed by ball.

Tuesday:

9.30 A.M.	Second General Session. First General Session M. S. P. A.
10.00 A.M.	National Association of Boards of Pharmacy.
10.00 A.M.	Ladies Shopping and Visiting.
1.30 P.M.	Ladies Boat Ride to Bois Blanc Island and Supper.
2.00 P.M.	National Association of Boards of Pharmacy.
2.30 P.M.	Scientific Section (1). Joint Session of Commercial Section and M. S. P. A. (1)
7.30 P.M.	House of Delegates. Meeting of Council.

Wednesday:

9.30 A.M.	Section on Education and Legislation (1). Section on Pharmacopœias and Formularies (1). Commercial Section (2). National Association of Boards of Pharmacy.
10.00 A.M.	Conference of Pharmaceutical Faculties.
12.30 P.M.	Luncheon of College Alumni.
2.00 P.M.	National Association of Boards of Pharmacy.
2.30 P.M.	Women's Section (1). Section on Practical Pharmacy and Dispensing (1).
2.30 P.M.	Scientific Section (2).
7.30 P.M.	Meeting of Council. Theatre Party for Ladies. Smoker for Men.

Thursday:

9.30 A.M.	Section on Education and Legislation (2).
	Scientific Section (3).
	Joint Session of Section Practical Pharmacy and Dispensing and M. S. P. A. (2).
10.00 A.M.	National Association of Boards of Pharmacy.
1.30 P.M.	Excursion for Everybody to St. Clair Flats.

Friday:

9.30 A.M.	Historical Pharmacy (1)
	Section on Pharmacopœias and Formularies (2)
	Women's Section (2).
2.30 P.M.	General Auto Ride
7.30 P.M.	Reorganization of Council.
8.00 P.M.	House of Delegates.
8.30 P.M.	Joint Session of Section on Edution and Legislation, A. C. P. F. and N. A. B. P.

Saturday:

9.00 A.M.	Meeting of Council.
10.30 A.M.	Final General Session.

In submitting the above program, we desire to say that each item of the program was very carefully considered, and the changes made were found necessary to meet the conditions, as we find them, some of which are beyond our control. The only exception to this is our suggestion to revert to our former custom of having the First General Session at 3.00 p. m. Monday, and the House of Delegates at 7.30 p. m.

Our reason for offering this suggestion is that we fear that the General Session held at 7.30 will seriously interfere with the reception in the evening. Even if we succeed in transferring much of the work usually done in the General Session to the House of Delegates, the one and a half hours allotted will not be sufficient to do what is left, including the work of the Nominating Committee. But even supposing that it were possible to transact all this business in one and a half hours, this brings us right up to the moment of the opening of the reception, 9.00 p. m. Since the room in which the session is to be held is the one in which the reception is to be held, it will be necessary to clear the room for that purpose, which takes time, and furthermore those who are active in the work of the session are also prominent at the reception, and they will require some time between these two engagements for preparations.

It seems to the committee that it will require but little mathematical calculation on the part of anyone experienced in how things move at such times to come to the conclusion that to hold the First General Session at 7.30 p. m. will result in pushing the opening of the reception well into the night, and in fact spoil that function, which to some of the visitors is a very important one.

On the other hand, should the House of Delegates meet at 7.30 and find it necessary to continue its deliberations beyond the hour of the reception, it could do so, as its officers are not the officers of the Association whose presence at the reception is necessary.

Inasmuch as a serious effort is going to be made to run our program on schedule time, let us not handicap ourselves in the start by making a schedule which it will be a mathematical impossibility to live up to.

I, therefore, move the adoption of the above program as a substitute for motion No. 35.

Yours very truly,
(Signed) LEONARD A. SELTZER.

The above motion will be known as *Motion No. 38 (Substitute Motion for Motions Nos. 35 and 36)*. Do you favor the adoption of the same?

CAMDEN, N. J., May 28, 1914.

To the Members of the Council of the American Pharmaceutical Association:

GENTLEMEN—Council Letter No. 21 contains a proposition from the William S. Merrell Chemical Company to assign a patent on Antiseptic Leaves to the American Pharmaceutical Association. As this matter is presented in this letter, several conditions are named. These conditions should receive the most careful consideration by the members of the Council before the proposition is accepted.

The assignment of this patent of the William S. Merrell Chemical Company is to be effective only "so far as the Association is concerned, provided this form is made official." Further, the Association is requested to formulate a price protection plan.

The first of these conditions seems to indicate that the assignment is made for the purpose of securing official recognition for this form of bichloride antiseptic medication. The Committee of Revision of the United States Pharmacopœia have voted to introduce a Bichloride of Mercury Antiseptic Tablet in deference to the extensive use of such tablets and the necessity for a legal standard therefor. I doubt if the Bichloride Antiseptic Leaf has yet attained such popularity or use as to receive official recognition, and I do not know that such a proposition has been presented to the Committee of Revision. It is evident that the American Pharmaceutical Association could not insure the pharmacopœial acceptance of any form of medication and this should not be made a condition of the Association's acceptance of the assignment of the patent.

The second proposition introduces another complication. The courts have not looked favorably upon any of the plans evolved for maintaining prices and this does not appear to be a proper field of work for the American Pharmaceutical Association to engage in.

It is intimated that the proposition of the William S. Merrell Chemical Company is on a par with that of the Norwich Pharmacal Company. That the members of the Council may have a clear understanding of the difference, I will explain that in the several conferences between the officers of the Nor-

wich Pharmacal Company and your President and Vice-President Apple, it was made very clear that the American Pharmaceutical Association could not be induced to engage in any commercial enterprise; that its acceptance of the assignment of their patent could only be accepted by the Association for the purpose of "promoting the public welfare" in accordance with the objects and aims set forth in the Constitution. The proposition which the Norwich Pharmacal Company submitted is a clean, clear, free-will offering, not associated with any conditions. It was the voluntary relinquishment of rights in the invention for the humanitarian purpose of safeguarding human life. The only reservation made was the right of manufacture by the inventor to be enjoyed in common with other manufacturers under such regulations as the Association may adopt to protect its rights under the U. S. patent laws.

I have no personal interest in any of these forms of Mercury Bichloride medication and am only concerned that the acceptance of such proposition shall be without conditions that might involve the Association in controversies or lawsuits.

Yours respectfully,
(Signed) GEORGE M. BERINGER.

J. W. ENGLAND,
Secretary of the Council.

415 North Thirty-third Street.

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COUNCIL LETTER No. 25.

PHILADELPHIA, PA., June 11, 1914.

To the Members of the Council:

Motions No. 34 (*Election of Members; Applications Nos.* 124 *to* 160, *inclusive*), *No.* 37 (*Election of Members. Nos.* 161 *to* 196, *inclusive*), and *No.* 38 (*Substitute Motion for Motions No.* 35 *and* 36) have each received a majority of affirmative votes.

Professor J. A. Koch, Chairman of the Executive Committee of the American Conference of Pharmaceutical Faculties, asks that provision be made in the program adopted under Motion No. 38 for a meeting of the Conference on Tuesday evening, August 25, at 8:30 p. m., and. if there is no objection, this will be done.

The following communication has been received:

COLUMBUS, OHIO, June 7, 1914.

Council of the American Pharmaceutical Association:

GENTLEMEN—The undersigned, a Committee representing and appointed from a meeting of the pharmacists of Columbus, Ohio, and its vicinity, called for the purpose of such action, respectfully petition your honorable body for its approval of the formation of a Local Branch of The American Pharmaceutical Association in and about this city, to be known as the Columbus Branch of the American Pharmaceutical Association.

They respectfully represent in support of their petition that they have received the pledges of the following-named "members of the Association in good standing,"—in accordance with the provisions of Article 1, Chapter XII of the By-Laws of the Association,—that they are desirous that such a Branch shall be formed in this vicinity:

Ackermann, P. J., Columbus.
Ashbrook, C. S., Mansfield
Bagley, Anna G., Columbus.
Beal, J. H., Scio.
Creighton, Mary L., Scio.
Dye, Clair A., Columbus.
Fickhardt, F. L., Circleville.
Ford, M. N., Columbus.
Franklin, Peter P., Columbus.
Hansen, M. K., Columbus.
Harp, L. D., Columbus.
Harrington, E. W., Columbus.
Hatton, E. W., Columbus.
Howson, A. B., Chillicothe.
Hauenstein, Sidney, Bluffton.
Hoffman, C. O., Arcanum.
Johnson, R. V., Columbus.
Kauffman, George B., Columbus.
Markworth, O. S., Columbus.
Marshall, E. C., Columbus.
McClintock, C. W., Columbus.
Oole, Edward, Columbus.
Powell, Fred A., Circleville.
Reed, C. D., Pomeroy.
Spease, Edward, Columbus.
Topping, George B., Columbus.
Webb, E. N., Columbus.

The Committee believe, should this petition be granted by your honorable body, that good results will result from the formation of this Branch, and they pledge themselves to make it a credit to the Association and to American Pharmacy.

Trusting that this petition will be granted, we beg to sign ourselves.

Yours very sincerely,
GEO. B. TOPPING,
EDWARD SPEASE,
ERNEST C. MARSHALL,
Committee.

Motion No. 39 (*Organization of Columbus Branch, A. Ph. A.*) Do you approve of the organization of the Columbus Branch of the American Pharmaceutical Association?

J. W. ENGLAND, Secretary.

415 N. 33d St.

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COUNCIL LETTER No. 26.

PHILADELPHIA, PA., June 18, 1914.

To the Members of the Council:

Professor E. Fullerton Cook, Chairman of Section of Pharmacopœias and Formularies, sends the following communication:

"The Section on Pharmacopœias and Formularies of the A. Ph. A. has planned as a feature of the meeting in Detroit a exhibition of the new or modified U. S. P. and N. F. preparations. It is believed that the plan,

as outlined below, will materially assist in familiarizing pharmacists with the new preparations and at the same time check up the formulas to avoid errors which may otherwise creep into the new books.

It is proposed to ask a number of pharmacists to each prepare twelve preparations. The committee will provide uniform bottles and the complete formula will be pasted on each bottle bearing a type-written label, this label to have upon it, title, ingredients, and directions for making. These preparations will then be exhibited at Detroit and those who have made the preparations will be invited to send in suggestions or comments.

I am writing this to you at the suggestion of Professor Beal to ask the Council for permission to give this amount of publicity to the new formulas of the N. F., and also for an appropriation to pay for the necessary bottles, label, type-writing and transportation charges. The Board of Trustees of the U. S. P. have sanctioned the plan for the U. S. P. preparations and appropriated $50, or such part thereof as may be necessary, for the expenses on the U. S. P. part of the work.

Will you kindly put this matter before the Council so that, if it is approved, I may proceed at once. The expense is estimated to be wihin $50."

The appropriation is approved by the Committee on Finance. Do you approve of the appropriation? This will be regarded as *Motion No.* 40 (*Appropriation of* $50 *or less to Section on Pharmacopoeias and Formularies*).

With reference to the proposition of the Wm. S. Merrell Chemical Co. (Council Letter No. 21, 53), and its offer of assignment of a patent on Antiseptic Leaves to the American Pharmaceutical Association, and President George M. Beringer's comments on the same (Council Letter No. 24, 63), Professor Julius A. Koch, to whom the original communication was addressed, writes as follows:

"I do not think that Mr. Beringer's objections are well founded. The assignment has been made in identically the same form and wording as that used by the Norwich Chemical Co. in their assignment. The Merrell Co. merely asks, that if it is within the province or power of the American Pharmaceutical Association, that their efforts be used to protect the retail pharmacist. This is not contrary to the policy of the Association which has for its object the betterment of Pharmacy.

If you have not as yet received a motion to accept the generous offer of the Wm. S. Merrell Co., Dr. Beal has asked me to present such a motion in his name and I will second the same."

The motion submitted is as follows:

(1) *Resolved*, That the American Pharmaceutical Association accept the complete assignment of the patent rights of the Wm. S. Merrell Chemical Co., in and to a design patent for a new, original and useful improvement in packages for Antiseptic Poisons, serial number 817,364, as tendered by the Wm. S. Merrell Chemical Co. in their communication to Professor Julius A. Koch, dated May 15, 1914, and presented in Council Letter No. 21.

(2) *Resolved*, That the American Pharmaceutical Association hold such design patent exclusively for the free use of the medical and pharmaceutical professions of the United States, without restrictions, except such as may be necessary to prevent possible abuse through use of the design for non-poisonous substances.

(3) *Resolved*, That the American Pharmaceutical Association hereby tenders to the Wm. S. Merrell Chemical Co. a vote of thanks for their generous and public spirited offer.

The above will be regarded as *Motion No.* 41 (*Assignment of Patent Rights for Improved Package for Antiseptic Poisons*).

The following communication has been received from Mr. Martin I. Wilbert:

"In the Bulletin of Pharmacy for June, 1914, Mr. Harry B. Mason publishes a copy of a letter to you in which he makes certain suggestions in regard to prospective changes in the meetings of the American Pharmaceutical Association. In a general way I wish to heartily indorse the suggestions and will endeavor to outline as nearly as possible my thoughts in regard to practical changes that should be made at the present time or in the very near future.

As I see it, there is absolutely no reason why the American Pharmaceutical Association should not conclude its meetings in four days allowing the two additional days of the week for the meetings of the Conference of Faculties and the Association of Boards of Pharmacy. My suggestions for a program would be as follows:

Monday, 9 a. m., Council Meeting.

Monday, 2 p. m., first general session restricted to the annual address of the President and the usual preliminaries for the selection of members of the nominating committee.

Intermission of fifteen minutes for the selection of members of the nominating committee, reconvening the Association for the second general session. At this second general session, the reports of committees should be received and referred to either the Sections of the Association or to the Council.

Monday evening, 8 p. m., meeting of the nominating committee; 9 p. m., reception.

Tuesday, 9-12 a. m., simultaneous sessions of the Sections on Scientific Papers, Education and Legislation, Practical Pharmacy, and Commercial Interests.

Tuesday, 2-5 p. m., simultaneous sessions of all Sections.

Tuesday evening, 8 p. m. to (?) a. m., meeting of the Council.

Wednesday, 9-12 a. m., simultaneous sessions of all the Sections.

Wednesday, 2-5 p. m., simultaneous sessions of all the Sections.

Wednesday evening, 8 p. m. to (?) a. m., meeting of the Council.

Thursday, 9-12 a. m., simultaneous sessions of all Sections.

Thursday p. m., concluding session of the Association, report on the proceedings of the Council, followed by adjournment.

It would, of course, be immaterial whether the meetings opened on Monday, Tuesday or Wednesday, the important matter being to concentrate the meetings and to eliminate the useless frills.

A program along the lines suggested would involve considerable pruning that would, I think, materially improve the proceedings of the Association. It would eliminate, among others, the Section on Pharmacopœias and Formularies, which I believe is quite unnecessary. Personally, I would prefer to restrict the activities of the Association to three Sections and to eliminate the so-called Section on Commercial Interests. The commercial interests of the pharmacist are either practical pharmacy or they are not pharmaceutical at all, and if not pharmaceutical have no room and no place in the American Pharmaceutical Association. The discussion of profitable sidelines, whether of the lunch-counter type, of the chicken-feed variety, or fake jewelry have little or nothing to do with pharmacy and should not be recognized in an organization designed primarily to discuss pharmaceutical problems.

My program would also eliminate the House of Delegates which has no legitimate room or place for existence, and in view of the fact that the Council already contains some thirty-eight or forty members with provisions for a further increase, I am inclined to believe that the latter body is quite sufficiently representative of the membership at large to take care of any business that may be referred to it.

One provision that I would like to see adopted in connection with the work of the Council is the recognition of alternates for members of the Council who are unable to attend the annual sessions. With a provision for alternates all sections of the country in which real live pharmacists can be found would be adequately represented and the members at large could readily intrust any business of the Association to such a representative Council.

This program also eliminates the so-called Women's Section which, as I understand, is not legally a part of the Association at the present time. While there can be absolutely no objection to an official or non-official Women's Auxiliary, there is, as I understand it, no provision in the constitution or by-laws of the Association that provides for election or recognition of non-members of the Association as members of a Section or as officers of a Section.

I most heartily endorse the proposition to insist that a full and complete program of all the communications to be presented be prepared in advance so that the members present at a meeting will know exactly what they may expect. I would even go further, however, and limit the number of papers to be presented at any one session and insist that time be allowed for discussion. If such a program is prepared and lived up to, I am sure that the members present at a meeting will be in a position to be benefited by attending the Section sessions which offer the most interesting material and the meetings of the Association will tend to the further elimination of unnecessary duplication.

I quite agree with others that meetings of the American Pharmaceutical Association should be devoid of what has been referred to as "gabfests" and should be restricted to the consideration of really worth while material that will be a credit to the Association and make for progress in the sciences of our calling."

J. W. ENGLAND,
Secretary of the Council.
415 N. Thirty-third Street.

The Pharmacist and the Law

PHARMACY LAW OF PORTO RICO.

LEY

PARA ENMENDAR LA SECCION 6 DE LA "LEY AUTORIZANDO LA ORGANIZACION DE UNA JUNTA DE FARMACIA," APROBADA EN 8 DE MARZO DE 1906, Y ENMENDADA 10 DE MARZO DE 1910.

Decretase por a Asamblea Legislativa de Puerto Rico:

Sección 1.—Que la Sección 6 de la "Ley autorizando la organización de una Junta de Farmacia," aprobada en 8 de marzo de 1906 y enmendada en 10 de marzo de 1910, se entienda redactado como sigue:

"Sección 6.—Los individuos que estudien en Puerto Rico la carrera de farmacia deberán presentar antes de recibir su licensia, certificación firmada por un licenciado en farmacia, haciendo constar que ha practicado en su oficina de farmacia por un periodo no menor de dos años. Deberán examinarse de las asignaturas comprendidas en el siguiente plan de estudios:

Primer curso.—Química Inorgánica Física, Higiene, Historia Natural (Botánica, Zoología y Mineralogía).

Segundo curso.—Química Orgánica, Fisiología, Materia Médica o Farmacéutica Ani-

mal y Mineral, Materia Médica o Farmacéutica Vegetal.

Tercer curso.—Práctica de Operaciones Farmacéuticas y Reconocimiento de Drogas, Estudia de la Farmacopea de los Estados Unidos, Toxicología e Incompatibilidades."

Sección 2.—Toda ley o parte de lay que se oponga a la presente queda derogada.

Sección 3.—Esta Ley comenzará a regir desde su aprobación.

Aprobada, 7 de marzo de 1912.

TRANSLATION.

To amend Sec. 6.—This Law authorized the organization of a Council in Pharmacy. Approved on the 8th day of March, 1906, and amended on the 10th day of March, 1910.

"Decreed by the Assembly Legislative of Porto Rico."

Sec. 1.—That Sec. 6—of the Law authorizing the organization of a Council in Pharmacy approved on the 8th day of March, 1906, and amended on the 10th day of March, 1910, that the following methods shall be adopted.

Sec. 6.—Those individuals who study in Porto Rico the profession of Pharmacy shall find it a duty to present, before receiving his license, a certificate signed by a licentiate in whose Pharmacy he has practiced for a period of two years, and he must also pass examinations in the following studies:

First Course.—Inorganic Chemistry, Physics, Hygiene, Natural History, including Botany, Zoology and Mineralogy.

Second Course. — Organic Chemistry, Higher Physics, Chemistry, Materia Medica, Animal, Mineral and Vegetable Pharmacology.

Third Course.—Practice in the operation of Pharmacy and be able to identify the different drugs; also in the study of the Pharmacopœia of the United States, Toxicology and Incompatibilities.

Sec. 2.—The whole Law or part of the Law that is opposed at present is waiting amendment.

Sec. 3.—This Law begins to govern after being approved.

Approved, March 7, 1912.

THE PORTO RICO COUNCIL OF PHARMACY.

President—Pedro Julia, San Juan.

Secretary—Jose Monclova, Rio Piedras.

Treasurer—Ramon L. Daubon, San Juan.

Members—Clemente Ramirez, Manati; J. Calderon Aponte, Catano.

Meetings:—

January, March, April.

June, September, November.

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LIABILITY OF DRUGGIST FOR CLERK'S MISTAKE.

Action was brought for death caused by taking tartar emetic given the deceased in mistake for cream of tartar. The answer denied the authority of the assistant to sell drugs. The defendant, who was a practicing physician, was in partnership with another in the drug business. His time was principally devoted to the practice of his profession, and his partner looked after the drug store. The firm employed a clerk, about 18 years of age, who was not a registered pharmacist. The deceased, with her brother, drove to the store, where, at her request, the brother asked the clerk, who was alone in the store, for 10 cents worth of cream of tartar. The clerk by mistake gave him tartar emetic, wrapping it up in an ordinary paper package, without a label. She drank this dissolved in water, and died in consequence. There was no proof that the deceased's brother, when he entered the store, knew, or had any reason to surmise, that there was any limitation on the clerk's authority. If one enters a store, the court said, and finds a person apparently in charge, in the absence of notice to the contrary, he has a right to presume that such person is authorized to sell any ordinary article of merchandise kept for the purpose of sale, and to rely upon upon his procuring and furnishing the article asked for. It is a matter of common knowledge that there is a class of chemical preparations such as bicarbonate of soda, chloride of lime, copperas, and cream of tartar, which, while in one sense drugs, are in such general use for domestic and other purposes as often to be sold in general stores in the smaller towns, and which require no special skill or knowledge. Even though the clerk disobeyed his instructions, it is a settled principle that a master is liable for the consequences of the negligent conduct of his servant, committed in the course of his employment, although the particular act complained of was unauthorized by the master, and was done in disobedience to his commands.

Judgment for the plaintiff was affirmed.

Moses v. Mathews, Nebraska Supreme Court, 146 N. W. 920.

SALE OF STOCK OF DRUGS—FRAUD—CANCELLATION.

Lewis and Rea entered into a written contract by which Lewis was to trade Rea certain lands and $2,100 for a stock of drugs. Lewis delivered a deed to one tract of the land, and paid Rea $1,000 in money, and took possession of the goods. While running the store, and perfecting title to the other lands, Rea fraudulently obtained possession of the stock, and refused to proceed further with the trade. Lewis sued for rescission of the contract, cancellation of his deeds, and a return of the money he had paid. Lewis did not, however, offer in his petition to restore to Rea a small amount of money received by him on the sale of drugs, etc., while he was in possession of the store. It was held that, as Rea had in his hands moneys paid by Lewis on the contract far in excess of the money Lewis had received, it was not vitally necessary that an offer to restore be stated in the petition.

Rea v. Lewis, Oklahoma Supreme Court, 139 Pac. 977.

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UNITED STATES PUBLIC HEALTH SERVICE.

List of Changes of Stations and Duties of Commissioned and Other Officers of the United States Public Health Service for the seven days ended May 20, 1914:

Assistant Surgeon-General L. E. Cofer. Granted 3 days' leave of absence from May 20, 1914. May 19, 1914.

Senior Surgeon S. D. Brooks. Detailed to accompany the Health Officer of Los Angeles, Cal., on inspection of Owens river water supply system. May 19, 1914.

Surgeon L. L. Williams. Detailed to attend the meeting of the American Medico-Psychological Association, to be held at Baltimore, Md., May 26-29, 1914. May 16, 1914.

Surgeon C. P. Wertenbaker. At the request of the Secretary of the State Board of Health of Vermont, detailed to attend the meeting of the Vermont Health Officers' Association to be held at Bellows Falls, Vt., May 21, 1914. May 13, 1914.

Surgeon H. S. Cumming. Detailed to attend the meeting of the Oyster Growers' and Dealers' Association of North America at Atlantic City, N. J., May 19-20, 1914. May 12, 1914.

Surgeon Carroll Fox. On request of the State Board of Health of Minnesota, directed to proceed to that State to make, in co-operation with that board, an investigation of sanitary administration in Minnesota. May 12, 1914.

Passed Assistant Surgeon R. E. Ebersole. Granted 7 days' additional leave of absence from May 21, 1914. May 18, 1914.

Passed Assistant Surgeon H. M. Manning. Granted 10 days' leave of absence from June 3, 1914. May 14, 1914.

Assistant Surgeon D. C. Turnipseed. Granted 7 days' leave of absence enroute to station. May 18, 1914.

Assistant Surgeon M. V. Safford. Directed to proceed to Quincy, Mass., to investigate suspected case of typhus fever. May 18, 1914.

Sanitary Engineer Joseph A Le Prince. Directed to proceed via Washington, D. C., to Erie, Pa., to make an inspection of Presque Isle in respect to the prevention of disease-bearing mosquitoes thence via Washington, D. C., to Raleigh, N. C., for duty in connection with malaria investigations. May 14, 1914.

BOARD CONVENED.

Board of commissioned medical officers convened to meet at the Bureau, on call of the Chairman, to prepare questions for the written examination of Pharmacist C. Stier to determine his fitness for promotion to the grade of Pharmacist of the first class. Detail for the Board: Assistant Surgeon-General W. C. Rucker, Chairman; Passed Assistant Surgeon Hugh de Valin, Recorder. May 18, 1914.

Official: RUPERT BLUE,
Surgeon-General.

List of Changes of Stations and Duties of Commissioned and Other Officers of the United States Public Health Service, for the seven days ended June 3, 1914:

Assistant Surgeon-General W. C. Rucker. Detailed to attend a meeting of the Surgeons' Association of the Baltimore and Ohio Railroad at Washington, D. C., June 18-20, 1914, and deliver an address on the subject f "Railway Sanitation." May 27, 1914.

Directed to proceed to Charleston, S. C., and deliver an address before the graduating class of the Medical Department of the University of South Carolina, June 4, 1914. May 27, 1914.

Surgeon J. A. Nydegger. Detailed to represent the Service at the annual meeting of the Medical and Chirurgical Faculty of

Maryland at Baltimore, Maryland, April 28-30, 1914. April 25, 1914.

Surgeon M. J. White. Directed, at the request of the State Board of Health of Kansas, to attend the annual conference of health officers to be held at Rosedale, Kansas, during the week beginning June 8, 1914, for the purpose of delivering a series of lectures on public health subjects. May 27, 1914.

Passed Assistant Surgeon W. H. Frost. Granted 1 day's leave of absence, May 31, 1914, under paragraph 193, Service Regulations. May 31, 1914.

Passed Assistant Surgeon E. H. Mullan. Directed to proceed to Baltimore, Md, about June 2, 1914, for the purpose of assisting Surgeon J. A. Nydegger in the examination of 1700 aliens due to arrive about that time. May 28, 1914.

Granted 10 days' leave of absence, on account of sickness, from May 12, 1914. May 26, 1914.

Passed Assistant Surgeon R. A. Herring. Granted 5 days' leave of absence from June 1, 1914. May 26, 1914.

Passed Assistant Surgeon J. R. Hurley. Detailed in addition to other duties, to assume the position of Superintendent of Hygiene and Sanitation Exhibits in the Departments of Education and Social Economy of the Panama-Pacific International Exposition. May 26, 1914.

Assistant Surgeon M. H. Neill. Granted 6 days' leave of absence from May 26, 1914, under paragraph 195, Service Regulations. May 25, 1914.

Assistant Surgeon J. H. Smith, Jr. Directed to report to the Superintendent, School of Instruction, Fort Trumbull, New London, Conn., for duty on Revenue-Cutter "Itasca" during the summer. June 3, 1914.

Assistant Surgeon John Sundwall. Directed to proceed from Lawrence to Rosedale, Kansas, in time to deliver lectures before the Annual School of Health Officers of Kansas, June 8-10, 1914, on the subject of pellagra thence to Washington, D. C., and report to the Director of the Hygienic Laboratory for duty. May 27, 1914.

Pharmacist J. V. La Grange. Granted 5 days' leave of absence from May 25, 1914, under paragraph 214, Service Regulations. May 25, 1914.

List of Changes of Stations and Duties of Commissioned and Other Officers of the United States Public Health Service, for the seven days ended June 10, 1914:

Assistant Surgeon-General J. W. Kerr. Detailed to attend the meeting of the Massachusetts Medical Society at Boston, Mass., June 9-10, 1914, for the purpose of presenting an address on the relation of physicians to public health organization and administration. June 6, 1914.

Surgeon P. M. Carrington. Granted 12 days' leave of absence from June 8, 1914. June 3, 1914.

Surgeon G. B. Young. Granted 1 year's leave of absence, without pay, from July 1, 1914. June 6, 1914.

Surgeon B. W. Brown. Directed to proceed to Boston, Mass., and assume charge of the Marine Hospital at that port. June 6, 1914.

Surgeon T. Clark. Directed to proceed to Ellis Island, N. Y., and report to the Chief Medical Officer for the purpose of familiarizing himself with methods followed in making examinations for mental disorders. June 4, 1914.

Surgeon L. L. Lumsden. Upon completion of preliminary sanitary survey in Lawrence County, Indiana, directed to proceed to Mississippi, with the force under his charge, for the purpose of making a similar survey of Union and another county of that State. June 3, 1914.

Surgeon John F. Anderson. Directed to proceed to Wilmington, N. C., and Savannah, Ga., for inspection of Service operations in field investigations of the public health. June 5, 1914.

Surgeon W. C. Billings. Granted 3 days' leave of absence from June 5, 1914, under paragraph 193, Service Regulations. June 4, 1914.

Surgeon J. Goldberger. Relieved from duty as member of board on new "Nomenclature of Diseases." June 5, 1914.

Surgeon J. W. Schreschewsky. Relieved from duty as recorder of board on new "Nomenclature of Diseases." June 5, 1914.

Passed Assistant Surgeon R. H. Creel. Directed, at the request of the Efficiency and Economy Committee of Illinois, to proceed to Springfield and other points in that State to make an investigation of sanitary administration and the laws under which it is conducted. June 6, 1914.

Passed Assistant Surgeon R. E. Ebersole. Granted 7 days' leave of absence from June 3, 1914, under paragraph 195, Service Regulations. June 4, 1914.

Passed Assistant Surgeon A. D. Foster. Upon completion of sanitary inspections in South Carolina, relieved from duty at Marine Hospital, New Orleans, La., and directed to proceed to Washington, D. C., and report to the Bureau for temporary duty. June 2, 1914.

Passed Assistant Surgeon N. Roberts. Directed to proceed to Philadelphia, Pa., and report to Senior Surgeon Fairfax Irwin for temporary duty in fumigation of vessels at that port. June 3, 1914.

Passed Assistant Surgeon E. R. Marshall. Relieved from duty at Honolulu, Hawaii, and directed to proceed to Providence, R. I., and assume charge of the Service at that port.

Changes of Address

All changes of address of members should be sent to the General Secretary promptly.

The Association will not be responsible for non-delivery of the Annual Volume or Year Book, or of the JOURNAL unless notice of change of address is received before shipment or mailing.

Both the old and the new address should be given, thus:

HENRY MILTON,
From 2342 Albion Place, St. Louis, Mo.
To 278 Dartmouth St., Boston, Mass.

Titles or degrees to be used in publications or in the official records should be given, and names should be *plainly* written, or typewritten.

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ROBINSON, D. W.,
From Ft. Mills, Corregidor, P. I.
To Sykesville, Maryland.

JACKMAN, WILBUR F.,
From Detroit Coll. of Med., Detroit, Mich.
To 69 Medbury Ave., Detroit, Mich.

CAMPBELL, ANDREW,
From 530 Duquesne Way, Pittsburgh, Pa.
To 530 Fernando St., Pittsburgh, Pa.

TRUBY, W. G.,
From Penn. and West St., Wilkinsburg, Pa.
To Presbyterian Hospital, Pittsburgh, Pa.

BLAKE, H. W.,
From 21 Mass. Ave., Boston, Mass.
To 1096 Commonwealth Ave., Boston, Mass.

MERRELL, CHARLES G.,
From P. O. Box 432, Cincinnati, Ohio,
To 3595 Wilson Ave., Avondale, Cincinnati, Ohio.

BAILEY, FREDERICK,
From 65 Merrimack St., Lowell, Mass.
To Chelmsford, Mass.

HAYWOOD, S. B.,
From 34 Willis St., Detroit, Mich.
To 1091 Second St., Detroit, Mich.

LIEBER, JEWEL C.,
From 1301 Euclid Ave., Massillon, Ohio.
To Srgt. Post Hosp., Ft. Sam Houston, Texas.

MCDANIEL, J. R.,
From 214 Ave.
To 214 Second St., N. Nashville, Tenn.

CLARK, AMOS W.,
From Care Post Master, Manila, P. I.
To Gen. Del., Yale, Ills.

REUM, A. W.,
From 1271 Third Ave., San Francisco, Cal.
To 1291 Stanyan St., San Francisco, Cal.

ARMSTRONG, C. E.,
From Bonne Terre, Mo.
To West Plains, Mo.

LAMAS, WM. R.,
From 8-14 Johnson St., Newark, N. J.
To 364 No. Seventh St., Newark, N. J.

HOWARD, JAMES D.,
From Etewah, Tenn.
To Andrews, No. Carolina.

CHISM, J. S.,
From 155 N. Main St., Wichita, Kans.
To 150 N. Main St., Wichita, Kans.

HARBOLD, JOHN F.,
From York, Pa.
To York, Pa., R. 12.

SEYFERT, PAUL,
From Bradentown, Fla.
To Thiensville, Wis.

POSEY, H. G.,
From P. O. Box 988, San Antonio, Texas.
To 1128 Peniston St., New Orleans, La.

DRUEL, LOUIS A.,
From 2000 No. Park Ave., Chicago, Ill.
To 1229 Wilson Ave., Chicago, Ill.

MAYER, JOSEPH L.,
From 200 Broadway, N. Y.
To 340 West 4th St., N. Y.

REISER, PHILIP,
From 562 Auburn St., Camden, N. Y.
To 588 Carman St., Camden, N. Y.

RICE, HERBERT E.,
From 169 Main St., Nashua, N. H.
To 55 Main St., Nashua, N. H.

BROMME, WILLIAM L., PH. G.,
From Glasgow, Montana.
To Kalispell, Montana, Care Kalispell Drug Company.

CARROLL, B. H.,
From 4734 17th Ave. N. E., Seattle, Wash.
To Colville, Wash.

SHIPE, COLUMBUS A.,
From Annona, Texas.
To San Marcos, Texas.

JOSENHANS, R.
From 1601 W. North Ave., Chicago, Ill.
To 1606 W. North Ave., Chicago, Ill.

BODEMANN, WILHELM,
From Hyde Park, Chicago, Ill.
To 5018 Lake Park Ave., Chicago, Ill.

DECEASED SINCE MAY 18, 1914.

SKELLY, J. J., New York, N. Y.

RESIGNED SINCE MAY 18, 1914.

KIMBERLY, CHARLES, Philadelphia, Pa.
WRIGHT, JAMES T., Newport, R. I.